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COMPUTERWORLD

What does the CEO think?

Notwithstanding concerted efforts to tie information systems more closely to business goals, a majority of corporate executives say they still do not feel they are getting their money's worth from their IS investment.

According to a *Computerworld*/Andersen Consulting survey of 200 senior corporate managers in Fortune 1,000 companies, chief executive officers are cooling to the notion that information technology, can, on its own, improve profitability or ensure competitive advantage.

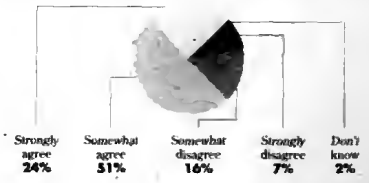
Despite these changes, satisfaction with IS performance has gone up since our last CEO survey two years ago. Full report begins on page 81.

Great expectations

. . . tempered by a growing sense of "realism"

"I believe that information systems hold the key to competitive advantage for my organization in the 1990s."

Respondent base of 200



Oracle latches on to Netware

BY JEAN S. BOZMAN
CW STAFF

SAN FRANCISCO — In a bid to make data fly farther and faster on local-area networks, Oracle Corp. said last week that it is shipping a version of its relational DBMS designed to work under Novell, Inc.'s Netware Version 3.1 operating system.

Oracle Server for Netware 386 — a Netware Loadable Module, or application, version of Oracle 6.0 — could pose another setback for OS/2 database server products, which are not yet widely installed, according to analysts.

While the database server products are dependent on OS/2, which has gained little market share, Netware 3.1 operates with personal computers using MS-DOS.

"The LAN database server market is absolutely not taking off," said Stuart Woodring, director of software strategy research at Forrester Research, Inc. in Cambridge, Mass. "What's holding it back is the limited penetration of OS/2 in the LAN market, a lack of high-quality tools to develop applications and the high level of support and consulting services needed to install such systems."

Oracle claimed four-fold greater performance for the Netware 3.1 system than the SQL/Server for OS/2 from Microsoft Corp. and Sybase, Inc. — and nearly the same improvement as its own Oracle Server for OS/2.

But analysts said most of the improvement is because of the substitution of an Intel Corp. 1486 engine for an older

Continued on page 119

Icy reception

Database server products from leading vendors have made relatively small inroads to date

1990 installed base (worldwide)

Oracle Corp.'s Oracle Server	13,500
Gupta Technologies, Inc.'s SQL Base Server	6,500
Sybase, Inc.'s SQL Server	5,000

Source: International Data Corp.

IBM leads charge to lower-cost 486s

BY RICHARD PASTORE
CW STAFF

Targeting users reluctant to pony up for pricey 1486-based personal computers, IBM and several clone vendors last week rolled out Intel Corp. 1486SX-based PCs, priced 25% below their cheapest 1486DX machines. The strategy may pay off, but the new chip is not expected to bury the Intel 80386-based PC or drastically depress prices anytime soon.

Just one day after Intel unveiled the 1486SX, IBM incorporated the 20-MHz chip into its Personal System/2 Models 90 and 95. At least seven other vendors joined in, announcing boxes or the intent to develop boxes based on the chip.

The 1486SX, which lacks the math coprocessor of the 1486DX, runs current 16-bit applications 10% to 40% faster than 33-MHz 80386 processors, Intel said. The chip maker predicted 1486SX chip shipments will equal those of 1486DXs by year's end.

In the IBM product line, a PS/2 Model 90 offers a 44% better price/performance than a comparable 25-MHz 80386-based PS/2 Model 80. Technology Investment Strategies Corp. in Framingham, Mass., rated the price/performance of the new Model 90 at $606 per million instructions per second, whereas the Model 80 was rated at $1,087 per MIPS.

These differentials have not been lost on users hungry for more power. "We've been staying away from the 486 because of the price. The [PS/2] 90s and 95s have just been too high," said Thomas Casey, a senior application project specialist at the Boston office of New York Life

Continued on page 6

Dbase copyright reinstated

BY JAMES DALY
CW STAFF

LOS ANGELES — Ashton-Tate Corp. cheated the hangman last week when a federal judge reversed his potentially devastating December ruling that had stripped the company of the copyright to its flagship Dbase product line.

Some observers noted that the unorthodox legal reversal is indicative of how unacquainted many judges are with high-technology law. "The judge goofed," said Paul Goodman, a software law attorney at the New York-based law firm of Elias, Goodman & Shanks. "He made a very radical initial decision and consequently was subjected to an accelerated learning process."

Experts warned, however, that Ashton-Tate is not yet off the gallows. The revocation by U.S. District Judge Terrence Hatter Jr. clears the way for the resumption of the legal action that prompted the initial

Continued on page 120

A $46 tape becomes a $10K print job

Government slow to open data files to freedom of information requests

BY MITCH BETTS
CW STAFF

For Brownstone Publishers, Inc. in New York, the database kept by the city buildings department was a gold mine of statistics it could market to the local real estate industry. Brownstone Publishers planned to use the state's Freedom of Information Act to get the data for just $46, the cost of copying the database onto computer tape.

However, city bureaucrats had other ideas. The department said it would only release the database in paper form, meaning a six-week, $10,000 printing job that would consume more than 1 million sheets of paper and force Brownstone Publishers to recomputerize the data at an estimated cost of several hundred thousand dollars.

The resulting court battle over whether the data should be released in paper or electronic form is a prime example of the growing tensions between government agencies and the various parties who are trying to obtain computerized government records under freedom of information laws.

The conflicts must often be settled through litigation to determine how the FOI laws, enacted when most government

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IBM pitches AS/400 as the Advanced System with SAA breakthrough and host of high-tech options. Page 6.

EDS signs up Continental Airlines in biggest outsourcing pact to date, Page 8.

Murder clues on floppy disk are key evidence in federal trial. Page 12.

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Quotable

"It may be that Compaq is running out of rabbits to pull out of its hat."

MARK STAHLMAN
ALEX. BROWN & SONS

On Compaq's disappointing first-quarter earnings. See story page 4.

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The 5th Wave

"I STARTED DESIGNING DATABASE SOFTWARE SYSTEMS AFTER SEEING HOW EASY IT WAS TO DESIGN OFFICE FURNITURE."

EXECUTIVE BRIEFING

■ **CEOs no longer believe in information technology as a magic bullet** for competitive success. According to an exclusive *Computerworld*/Andersen Consulting survey of 200 top business executives, the view from the top has matured into a new, better-focused reality. Top executives at many organizations are concentrating on targeted and carefully cost-justified projects, while emphasizing re-engineering of business processes around information systems. **Page 81.** One such CEO is Sea-Land's Alex J. Mandl, who wants to see real payback from systems and emphasizes the need for proper employee IS training. **Page 67.**

■ **Oracle makes a bold bid** for LAN platforms. Its relational database management system will now run under Novell's Netware, posing a challenge to OS/2-based database server products currently running under Microsoft's LAN Manager. Novell is also reportedly pursuing an industrywide database server strategy with other RDBMS companies. **Page 1.**

■ **EDS consummates the largest outsourcing deal ever,** a $2.1 billion pact to provide IS services for 10 years to Continental Airlines and System One. However, the contract is half the size of the one originally announced 14 months ago. **Page 8.**

■ **Wang and Compaq each report bad financial news.** Wang's red ink continued to flow in the first quarter on a 16% plunge in revenue, while Compaq shocks Wall Street by predicting that second-quarter sales will fall below last year's levels. **Page 4.**

■ **Citibank will become the first user** of global point-to-point ISDN, with five lines in operation beginning next month. Until now, global networks had to give up ISDN capability at some point along the way. Citibank's network will connect New York to three sites in Europe and one in Singapore. **Page 16.**

■ **The Bush administration outlines critical technologies for the U.S.,** edging closer to government-sponsored programs to support them. Among them are software, high-performance computing, high-definition imaging and computer simulation. **Page 119.**

■ **The PC price war continues** as IBM and others unveil cheaper models based on the new Intel I486SX chip. The Personal System/2 Models 90 and 95 promise significant price/performance advantages over 80386-based models. **Page 1.**

■ **Ten competing California HMOs** agree to cooperate on setting EDI and other data standards for the industry. **Page 67.**

■ **A small software vendor sues OSF,** claiming the vendor consortium violates antitrust laws. The plaintiff, Champaign, Ill.-based Addamax, recently lost a bid for OSF business. **Page 10.**

■ **Software maintenance spending** can be cut in half by implementing a software quality improvement plan. The plan must target IS measurement, the development process and software skills and technologies. **Page 93.**

■ **Middle-aged IS workers are feeling the squeeze** from college graduates willing to start at low salaries and retirees re-entering the work force. **Page 103.**

■ **PC dealers are jumping through hoops,** offering deals galore to get the attention of largely uninterested IS buyers. **Page 112.**

■ **On-site this week:** The Indiana Pacers' hopes in the NBA playoffs rest partially on Poqet computers and a LAN with 25 NEC PCs. Pacer coaches use the computers to plot game strategy based on opponents' tendencies in certain situations with particular players. **Page 45.**

"Have You Seen What They Did With CA-IDMS?"

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CA90s

COMPUTER ASSOCIATES

Wang loss worse than feared

BY NELL MARGOLIS
CW STAFF

LOWELL, Mass. — Still in the throes of a precarious product-line transition and hard-hit by adverse financial trends at home and abroad, Wang Laboratories, Inc. last week posted a staggering fiscal third-quarter loss and a steep revenue slide.

For the quarter ended March 31, Wang reported a $48.9 million loss on revenue of $499.7 million, down 16% from last year's comparable period. "I didn't think I was about to see a good quarter from Wang, but I didn't expect anything this bad," said Roger Sullivan, an analyst at Norwell, Mass.-based BIS Strategic Decisions.

According to Chief Executive Officer Richard Miller, the worldwide recession, war in the Middle East and "continued weakness in the computer business and other industries" combined to derail Wang's turnaround. The potency of his remarks may have been sapped somewhat by the same-day release of stronger-than-expected quarterly figures by neighboring minicomputer vendor Data General Corp. (see story below).

Perhaps even more worrisome, Sullivan said, was Miller's note that revenue decreases from Wang's traditional minicomputer lines are continuing to outpace revenue gains from new products and services. "Traditional business is drying up at an absolutely alarming rate," Sullivan said. "Economists are saying that the recession could wear on through August. If that turns out to be true, the pressure on Wang to really succeed with the up-and-coming product rollout promised for [the current] quarter is intense."

The company's recently announced Office 2000 game plan [CW, April 15], which aims Unix-based image processing applications at the office automation market, has been praised by analysts as strategically sound and potentially promising. However, said Chris Christiansen, an analyst at Westport, Conn.-based Meta Group, Inc., "Let's be serious — there are no products here. At least, no major ones deliverable today." The earliest Office 2000 products are slated for rollout in May.

And while time may be running out for Wang, Sullivan said, competition is intensifying — not only from traditional sources such as Sun Microsystems, Inc. but from IBM emerging as an imaging contender.

Even Wang's statement last week that its cash reserves were at the highest point in 18 months raised some eyebrows. "It looks like they're either making the company more attractive to a friendly buyer or else positioning to acquire someone else," Christiansen said.

Nevertheless, he and other analysts noted that Miller has proven adept at leveling Wang's once-staggering debt load, instilling a commitment to quality "that's been a deficit at Wang over the past several years," and focusing the firm on a strategy that could have it giving customers what they want. "There must be a few rabbits he can pull out of the hat" to keep the money from running out before the products phase in, Sullivan said.

Fiscal squeeze

An eroding revenue base continues to cloud Wang Laboratories, Inc.'s future

WANG

Revenue (in millions)

3Q '89	$732.6
4Q '89	$730.9
1Q '90	$604.8
2Q '90	$646.7
3Q '90	$593.5
4Q '90	$652.2
1Q '91	$343.0
2Q '91	$319.5
3Q '91	$499.7

Source: Wang — CW Chart: Tom Monahan

Compaq slow growth blamed on competition, recession

BY RICHARD PASTORE
CW STAFF

Compaq Computer Corp.'s Wall Street bubble burst last week. The personal computer maker's first-quarter earnings were not up to par, partly because of recent price cuts and the soaring dollar abroad. Compaq added to the dismay by predicting a decline in second-quarter revenue vs. the previous year's quarter.

"It may be that Compaq is running out of rabbits to pull out of its hat," said Mark Stahlman, an analyst at Alex. Brown & Sons, Inc. in New York. Compaq had been able to maintain high margins and solid growth last year despite the slumping PC market, he noted.

Compaq reported revenue up 11% to $871 million for the quarter ended March 31. In the previous four quarters, Compaq averaged better than a 26% sales growth rate. The company's profit rose to $92 million, a 24% increase over net income logged in the corresponding quarter last year.

Compaq said its quarter was affected by the recession, the Persian Gulf war and dollar appreciation overseas. But the Houston-based PC maker also hurt itself with its recent price-cutting strategy.

The biggest toll probably came from rapid appreciation of the dollar relative to European currencies. Compaq garners 59% of its revenue overseas. International sales rose only 16% in the first quarter, compared with numbers in the 70% range last year.

A dip overseas?

The dollar factor is expected to intensify and may cause total overseas revenue in the next quarter to dip compared with last year, Compaq officials warned. That in turn may cause overall revenue to decline in the second quarter ending June 30.

The warning soured investors on Compaq as the stock value fell 15% to 52½ points late last week.

Though it announced the sweeping price cuts only two weeks ago [CW, April 22], Compaq took an earnings hit when it applied the reduced prices to products already in the distribution channel, said Eric Zimits, an analyst at Rauscher Pierce Refsnes, Inc. in Dallas.

As evidence of the price cuts' impact, Compaq's North American box shipments grew at a relatively healthy pace of 20%, but revenue grew only 5%.

DG profits on upswing

BY NELL MARGOLIS
CW STAFF

A charter member of perhaps the computer industry's most beleaguered sector — old-guard minicomputer companies in transition to open systems — last week posted an upside surprise that analysts said showed signs of true staying power.

Westboro, Mass.-based Data General Corp. reported net income of $19.2 million on revenue up 2% at $320.4 million for its fiscal second quarter ended March 31. The second consecutive profitable quarter after two years in the red contrasted sharply with the $8.6 million net loss a year earlier.

Chief Executive Officer Ronald Skates credited the strong quarter to mounting sales of the Aviion workstation family.

Brown Brothers Harriman & Co. analyst William Milton Jr. said DG's biggest stunner was that revenue from its MV minicomputer line held steady for the third quarter in a row.

"IBM's hardware revenue is down 17% this quarter, Compaq is hurting, and Data General is selling minicomputers in the middle of a recession," Milton said. "Who would have ever believed it?"

In contrast, Unisys Corp. issued another dismal financial report last week, losing $98.2 million on revenue of $2.06 billion. A year ago, Unisys lost $3.2 million on revenue of $2.31 billion.

Chairman and CEO James A. Unruh blamed the weak worldwide economy and a general slowdown in the computer industry. He conceded that the firm might have to renegotiate its $1.25 billion revolving credit agreement with its lenders. That agreement stipulates Unisys must maintain a net worth of $3.5 billion.

If Unisys technically defaults on its loans, said Duff & Phelps, Inc. analyst David Schofield Jr., it is uncertain what action the bank consortium would take — "But loss of the revolver would force Unisys into bankruptcy, in our opinion," he said.

Meanwhile, tight cost control and healthy sales rocketed Sun Microsystems, Inc. sales up 34% to $848.3 million with profits growing 60% to $58.7 million for its fiscal third quarter.

Sun's quarter outdistanced expectations, said John Girton, an analyst at Van Kasper & Co., in San Francisco. "Sun's big story this quarter is that they held operating costs under really tight control," he said. But, he warned, "this can't continue; they're going to have to spend more on R&D."

Sun's rival, Mips Computer Systems, Inc., showed a 36% revenue increase to $43.9 million. However, a steep year-to-year increase in the cost of producing such sales sapped Mips' profits, which fell 82% from last year's first-quarter net of $3.5 million to $.62 million.

CORRECTIONS

An article in the March 25 Product Spotlight titled "Estimating maintenance costs" incorrectly stated that Software Quality Management System from Software Quality Tools Corp. has not yet been released. An MS-DOS version is due for release in the near future. A Unix version of the program has been available since last September.

In the same article, Amherst, N.H.-based Softstar Systems was incorrectly identified as Softstar International, Inc.

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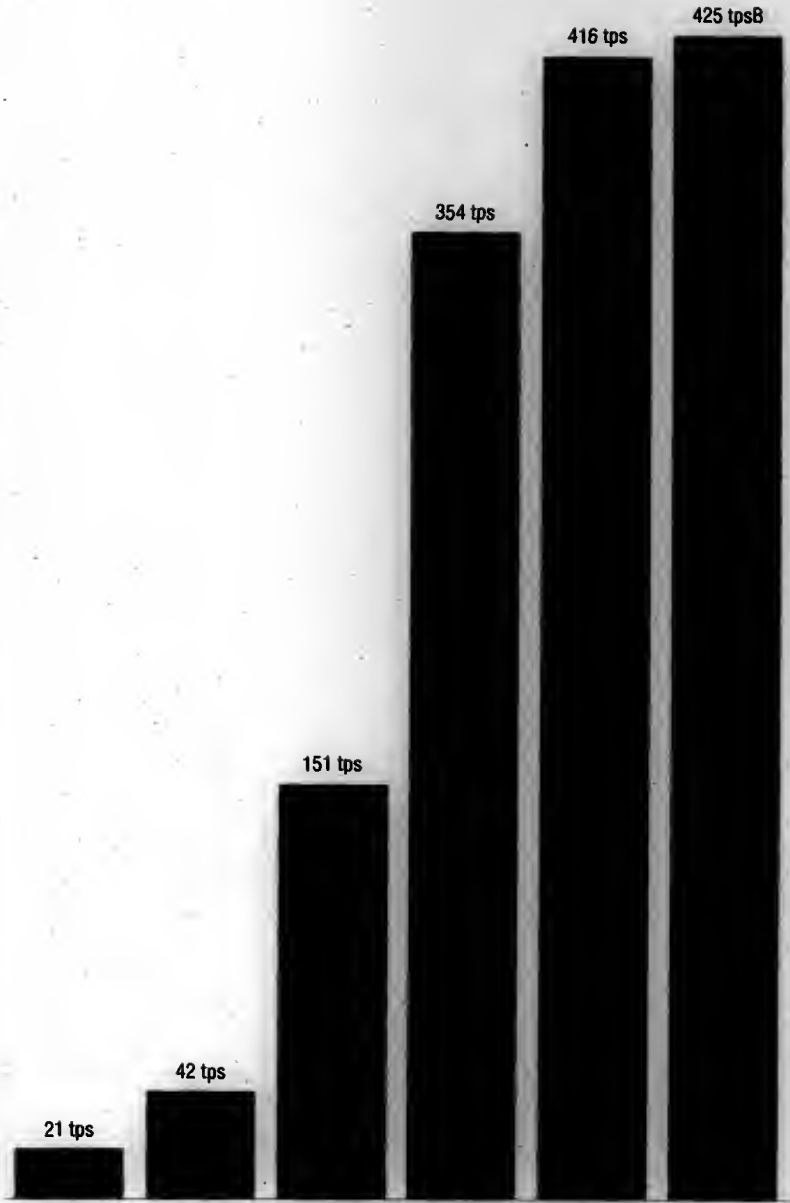

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AS/400 line racks up performance gains

BY MARYFRAN JOHNSON
CW STAFF

NEW YORK — IBM festooned its new Application System/400 D models with an arsenal of new technologies, advanced applications and sharply competitive prices last week in an announcement that industry analysts and customers say is IBM's most significant rollout for 1991.

With performance and power increases of 30% to 60% — and price cuts from 10% to 40% over current models — the 11 AS/400 D models swept aside the current B models and replaced the OS/400 operating system with a new version.

MODEL	PRICE	RELATIVE PERFORMANCE
9402		
D04	$16,250	1.5
D06	$23,850	1.9
9404		
D10	$21,950	1.9
D20	$41,500	2.4
D25	$79,500	3.4
9406		
D35	$47,600	2.6
D45	$97,700	3.7
D50	$155,000	4.8
D60	$272,000	8.3
D70	$405,000	11.2
D80	$730,000	19.8

Source: IBM — CW Chart: Doreen St. John

One of the more significant but less emphasized parts of the announcement is the AS/400's new prominence as a Systems Application Architecture (SAA) platform. From its stepchild status as the last platform to get SAA capabilities, the AS/400 is now set to leapfrog IBM's mainframe and workstation lines with superior distributed database capabilities in mid-1992 (see related story this page).

Bill Sines, an analyst at Technology Investment Strategies Corp. in Framingham, Mass., said the "clear price/performance advantages" of the new AS/400s finally make the machine a formidable competitor against other proprietary midrange systems from Digital Equipment Corp. and Hewlett-Packard Co.

"Up until now, our larger sites just didn't take the AS/400 seriously," said John Palm, vice president of systems at Gannett Co. in Arlington, Va., publisher of *USA Today* and 81 other daily newspapers.

Yet, Palm said the high-end capabilities of the AS/400 D models, particularly new remote diagnostic features, will be critical to Gannett, which manages computer support operations centrally from Washington, D.C.

Analysts said IBM hopes to cut a swath through encroaching personal computer local-area network servers by positioning the AS/400 as the ideal "high-function" applications server on a multivendor network. The new systems are beefed up with server support features for cooperative processing and improvements in PC connectivity and access.

Customers may end up feeling a bit rushed, however, as IBM aggressively pushes their migration to the new platform with trade-in deals and upgrade packages that start expiring toward the end of next year. IBM will also be charging 10% to 15% more each time new versions of the operating system are released, analysts said.

Considering options

Caught smack in the middle of a 46-machine rollout of AS/400s, Richard Deckard, vice president of data processing at Atlanta-based Manheim Auto Auction Division, part of Cox Enterprises, Inc., was glumly considering his options last week. He discovered the 20 machines he had already installed will cost $678,000 to upgrade, add disk storage and replace third-party memory that will not run under the new operating system.

Another customer in the midst of rolling out an AS/400 network is Bryan Meyers, director of information services at KOA Kampgrounds of America in Billings, Mont. By 1993, KOA plans to have 60 to 70 small AS/400s dispersed to its campgrounds nationwide.

"So far, we've gone from ordering B10s to C10s to C04s, as every new model came out," Meyers said.

Several System/36 users said this announcement may act as a catalyst for moving them off IBM's earlier and widely popular systems. "The price will get us in," said Jerry Taylor, MIS supervisor at Chicago-based Children's Home and Aid of Illinois.

The dual-processor AS/400 D80, which can support up to 600 concurrent users, was a relief for Tiffany & Co.'a data center in Parsippany, N.J., which expects to take delivery this week. "Our only concerns on the AS/400 were wondering if IBM could stay a step ahead of us. It was like fighting fires every year to get through the Christmas season," said Eric Corbman, director of development center at Tiffany.

Computerworld correspondent Ellis Booker contributed to this report.

Bells and whistles

The AS/400 D models are packed with advanced technologies in everything from a laser-driven fiber-optic I/O bus to IBM'a latest 45-nsec CMOS technology. A host of new software products, such as knowledge-based systems for business use and third-party alliances, rounded out the offering.

The following are some highlights of last week's announcements:

- The new operating system, OS/400 Version 2, includes new migration aids for System/36 users, extensions for Advanced Peer-to-Peer Networking and more than 200 open application programming interfaces.
- Greater flexibility on the AS/400 is provided for personal computer users and developers through improved networking performance, availability of remote SQL services and client coexistence with Novell, Inc.'a Netware 3.1. IBM added compatibility with Microsoft Corp.'a Windows 3.0 and doubled the throughput of its new Token Ring adapter.
- Gupta Technologies, Inc. in Menlo Park, Calif., announced AS/400 support for its SQLwindows software, and Wall Data, Inc. in Redmond, Wash., is delivering a Windows-based emulator called Rumba/400 that will enable PC users running Windows to interact with applications stored on the AS/400.
- Introduction of the IBM 3995 Compact Optical Library Dataserver, a 5¼-in., write-once, read-many optical drive for small to midsize imaging customers. The $52,000 jukebox can store 20 unformatted gigabytes, or the equivalent of 300,000 pieces of paper.
- Systems Application Architecture (SAA) support was extended to include data sharing among different SQL databases and to improve SQL functions. The AS/400 is the first IBM platform to announce general availability in March 1992 of products supporting Distributed Relational Data Architecture, which allows data and application sharing among heterogeneous systems on a network.

MARYFRAN JOHNSON

IBM

FROM PAGE 1

Insurance Co.

Casey said he would like to replace his Model 80 servers with 1486-based PCs by the end of the year, and the new 1486SX boxes sound appealing.

"The software we use does not support a math coprocessor," Casey added, noting that he would not miss that component in the 1486SX.

"I would definitely buy the 486SX; there'a a need for something less expensive," said Darrell Hess, computer consultant at New York accounting firm Buchbinder Tunick & Co.

Analysts said the new boxes will not have a major impact on market pricing this year. Prices for 80386 and 80386SX boxes will decrease over time but not to bargain-basement levels.

The reasons? Ramp-up requirements will keep 1486SX shipments relatively low, and most software still has not outstripped the capabilities of the 80386. Indeed, there is no irresistible 32-bit software title to propel users to invest in higher performance systems, said William Ablondi, an analyst at BIS Strategic Decisions in Norwell, Mass.

Interest in 32-bit application development may climb once the 1486SX racks up volume sales. But the arrival of 32-bit operating systems from IBM and Microsoft Corp. will be the real spark for this market.

Pricing pressures

Prices of 80386DX and SX systems are more dependent on the sweeping reductions made recently by Compaq Computer Corp. and IBM last week. Admitting it is responding to competitive pressures, IBM announced 3% to 38% reductions on several models, including the newly discontinued Model 50Z, 65SX and some versions of the Model 70 386.

IBM's new machines offer the same features as the previous Model 90 and 95 versions, including the Micro Channel Architecture bus and 4M bytes of standard memory. Both models are CPU-upgradable to 25-MHz or 33-MHz 1486DX systems. The 90 is shipping immediately, and the 95 is set to ship in July.

Turn up the heat

Coupled with Compaq'a earlier repricing, IBM'a pricing move has turned up the heat on second-tier clones — especially at the low end. Advanced Logic Research, Inc. gave in late last week, cutting some 80386SX system prices 13% to 17%.

AST Research, Inc. also announced last week that it planned to trim the price of one 386SX system.

AST is still evaluating the need for further movement. "We will look at Compaq's success this week to determine our best course of action," said Larry Fortmuller, director of systems marketing.

Ablondi predicted 15% to 20% annual reductions in 80386 system pricing in 1992.

Buyer's market

PC vendors were quick to offer new systems based on Intel Corp.'s 1486SX chip

Vendor	Product	Base configuration	Base price	Ship date
Acer America Corp.	Acer-power 1486SX	2M bytes random-access memory, Video Graphics Array	$2,745	now
Advanced Logic Research, Inc.	Businessveiss 1486ASX	4M bytes RAM, Extended Industry Standard Architecture bus, 80M-byte hard disk*	$3,495	May
AST Research, Inc.	Premium II 1486SX/20	4M bytes RAM, 80M-byte hard disk*	$3,695	May
Everex Systems, Inc.	Tempo 1486SX/20	1M byte RAM	$2,999	now

*ALR and AST also offer diskless configurations at lower list prices

CW Chart: Doreen St. John

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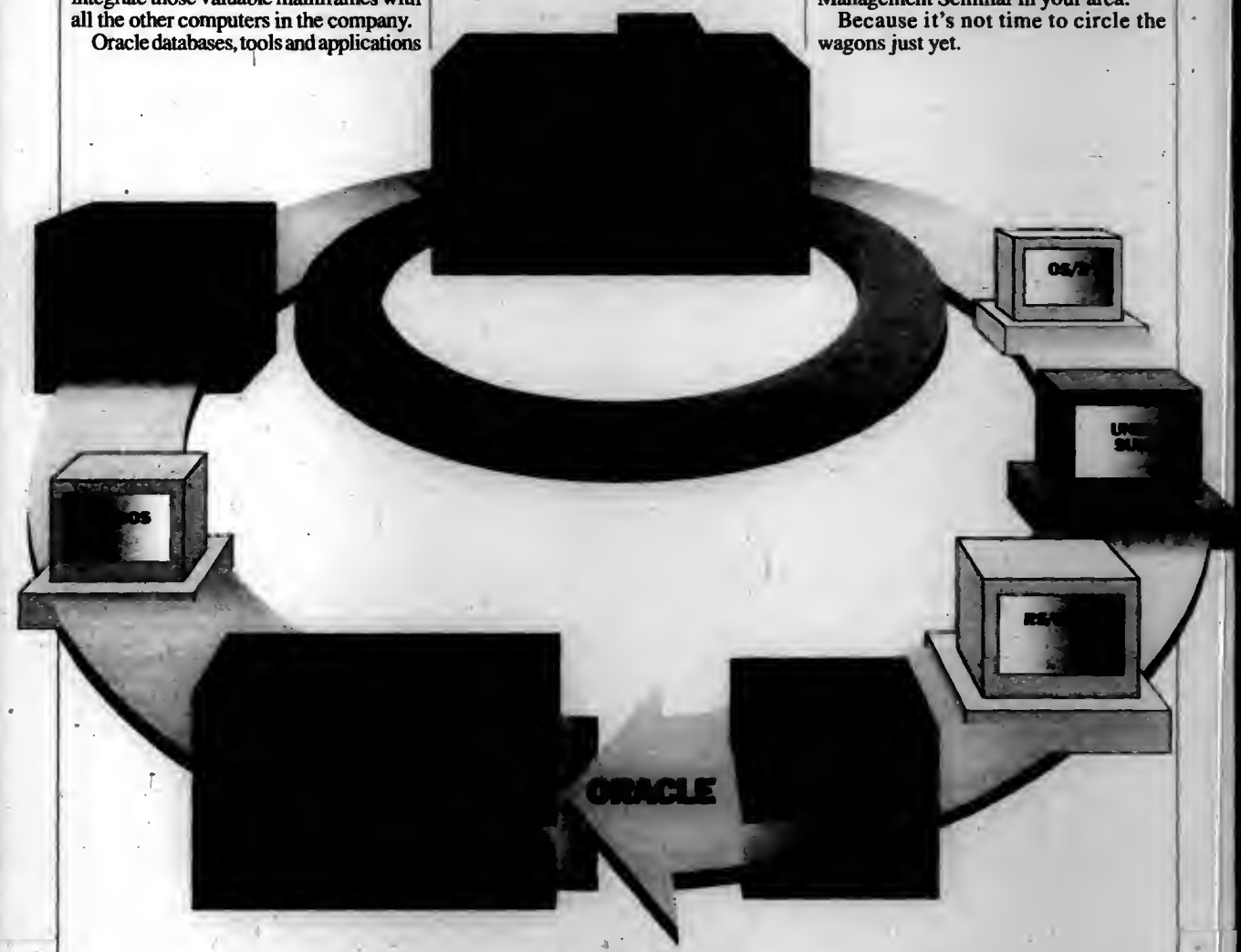

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NEWS SHORTS

House panel gets Inslaw papers

After months of resistance, the U.S. Department of Justice agreed last week to turn over 200 documents sought by the House Judiciary Committee in its investigation into charges by software developer Inslaw, Inc. that the Justice Department stole and is still illegally using Inslaw's case-tracking software. Committee Chairman Jack Brooks (D-Texas) said he had negotiated access to the documents over several weeks with Attorney General Dick Thornburgh. "The committee can now move forward with its investigation to seek a resolution of the many outstanding issues before it," Brooks said.

Lyons new chairman at Ashton-Tate

Ashton-Tate Corp. has announced that Chief Executive Officer William Lyons has been named chairman of the board. Dave Proctor, executive vice president of product development, was simultaneously named president and chief operating officer and will continue to manage all product development. Lyons, a 19-year veteran at IBM, has been CEO of the Torrance, Calif., database maker since December and was elected president and COO in April 1990.

Connor heads Lotus group

There has been yet another changing of the guard at Lotus Development Corp., this time involving the Consulting Services Group. David Connor, formerly a partner at Deloitte & Touche, has been named a vice president and will head up the group. Connor replaces former Lotus Vice President Frank Moss, who recently left to become CEO at Tivoli Systems, an Austin, Texas-based start-up. The group recently expanded by adding a Lotus Notes-specific section.

NET suffers loss

Network Equipment Technologies Corp. (NET) reported a net loss of $46.1 million in fiscal year 1991. Revenue did a free-fall from $180.8 million last year to $135 million this year. NET was rocked last year by alleged false sales bookings with resulting management shake-ups and shareholder lawsuits.

NCR to service Northgate machines

Northgate Computer Systems, Inc. last week announced it had signed an agreement with NCR Corp.'a service division to provide field service for all Northgate sites in the U.S. NCR replaces Bell Atlantic Corp. as Northgate'a service provider. Northgate Chairman Arthur Lazere praised Bell Atlantic but said NCR was able to provide same-day coverage service throughout the U.S., which he hopes will help win corporate accounts for Northgate. Also last week, Northgate announced record first-quarter profits of $2.24 million on sales of $46.94 million, compared with first-quarter 1990 profits of $2.1 million in profits on $47.21 million in sales.

OSF/1 shown on RS/6000

IBM demonstrated the Open Software Foundation's OSF/1 operating system on the RISC System/6000 workstation last week at the AIX Forum in La Hugle, Belgium. Based on the Unix operating system kernel, OSF/1 runs on a wide range of computer platforms and incorporates technologies submitted by member companies of the OSF. IBM previously demonstrated OSF/1 on the IBM Personal System/2 computer and the System/390 mainframe.

Businessland, shareholders settle

Beleaguered computer dealer Businessland, Inc. agreed to settle five shareholder class action suits last week by offering $2 million in cash and stock valued at $4 million. Without admitting any wrongdoing, CEO David Norman said, "Settlement at this time will avoid lengthy and expensive litigation and eliminate further distraction of our management team." Businessland has not made a profit in more than one year. The settlement awaits approval by the court.

More news shorts on page 120

EDS captures airline contract

Outsourcing deal is largest ever; marks firm's entry to airline services

BY CLINTON WILDER
CW STAFF

DALLAS — Electronic Data Systems Corp. had to settle for half a loaf, but that was enough to be the largest outsourcing deal to date and EDS' long-awaited entry into the airline services business.

Last week, EDS announced a $2.1 billion, 10-year contract to provide all information technology services to Continental Airlines and its reservation system, System One. However, the deal falls far short of the original $4 billion pact announced more than one year ago [CW, Feb. 26, 1990], which called for EDS to service now-defunct Eastern Airlines and also own a 50% equity stake in System One.

The latter provision was scrapped after Continental's parent, Continental Airlines Holdings, Inc., filed for bankruptcy protection under Chapter 11, fuel prices soared, and IBM Credit Corp. (ICC) filed a lawsuit against the deal (CW, Nov. 5, 1990). But analysts said EDS may be better off sticking to the outsourcing services.

"This looks like it has most of the advantages of the earlier deal and few of the disadvantages," said Martin Ressinger at Duff & Phelps Investment Research Co. in Chicago.

One analyst speculated that EDS may still have an interest in other reservation systems such as Amadeus, a European system in which Houston-based Continental holds a stake.

"This gives EDS the best of all possible worlds — access to the System One software and people," said Stephen McClellan, vice president of securities research at Merrill Lynch & Co. in New York.

EDS will hire 1,860 System One information systems professionals to run data centers in Miami, Houston and Los Angeles.

Another factor that prevented EDS from acquiring System One was a lawsuit filed by ICC objecting to the transfer of ICC leases from System One to EDS. The suit was dropped when the acquisition was canceled. An ICC spokesman said the firm was involved in the current deal only as a Continental creditor on file in the bankruptcy proceedings.

EDS will acquire one small piece of System One, the Airline Services Division, for a reported $35 million. The division provides scheduling and ticketing services (but not reservations) to 170 small regional airlines and has annual revenue of about $30 million. This acquisition was part of the original deal.

Hackers find open season on Internet

BY MICHAEL ALEXANDER
CW STAFF

Computer hackers from all over the world are routinely cruising the Internet network and attempting to penetrate a wide range of computer systems operated by the U.S. military, defense contractors and academic computer centers.

The number of attacks has increased dramatically within the past year, although it appears that the hackers have caused little damage, according to security experts and systems administrators whose computers are linked to the nationwide network.

"We see attacks from England, Australia, Spain, Norway ... There is an incredible number of countries involved," said Eugene Schultz, a computer scientist who heads the Department of Energy's Computer Incidence Advisory Capability at Lawrence Livermore National Laboratory. "There are hacking clubs in every country in Europe."

The Dutch connection

The New York Times reported last week that a group of Dutch hackers was openly defying U.S. military, space and intelligence authorities by breaking into Internet sites.

Security experts said last week that several of the attacks have appeared to originate from the Netherlands, but it is nearly impossible to say with certainty.

Some hackers route telephone calls through the Netherlands in order to cover their tracks or because there are no Dutch laws prohibiting illegal computer access. "A lot of the calls are traced back to the Netherlands because it is a free stomping ground," explained Ron Tencati, National Aeronautics and Space Administration Science Internet security manager at Goddard Space Flight Center in Greenbelt, Md.

During the past year, overseas hackers have entered a wide range of sites including Anniston Army Depot in Alabama, Aberdeen Ballistic Research Laboratory in Maryland and the Johnson Space Center in Texas, according to security experts.

"Computer Fraud & Security Bulletin," a newsletter published in London, reported recently that Dutch hackers were systematically rifling military computer systems using the Unix Grep command to search for specific character strings. The strings included "Patriot," "missiles" and "weapons," the newsletter reported. In February, a Dutch television station interviewed an unidentified hacker who claimed to have collected sensitive information related to Operation Desert Storm.

The U.S. Air Force Office of Special Investigation, the Federal Bureau of Investigation and other federal agencies are said to be investigating the claims. However, there is no evidence that Dutch or any other hackers are mounting a coordinated effort to penetrate U.S. military systems, security experts said.

However, hackers, perhaps Dutch, have managed to penetrate about a dozen machines at the University of Chicago since last summer, said Scott Teissler, vice provost for information technology. In one instance, they deposited word processing files of "government origin" on a machine belonging to a vacationing professor, Teissler said. The pirated files had no apparent value, he added.

"They did no damage, and although they were using accounts illegally, they were using them to explore and probe to get onto other machines," Teissler said.

The lack of computer security has been a longtime problem at Internet sites. Even unskilled hackers can successfully penetrate systems by exploiting default and commonly used passwords as well as the sort of loopholes that were exposed by a worm program released on Internet by hacker Robert Morris more than two years ago.

There are some 300,000 sites on Internet, and the network is growing 20% per month, according to a spokesman for the U.S. Department of Defense's Computer Emergency Response Team based at Carnegie Mellon University in Pittsburgh.

"The new people that are connected are not as versed about system security," the spokesman said.

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Spurned firm brings antitrust suit against OSF

BY JOANIE M. WEXLER
CW STAFF

BOSTON — A small software firm officially challenged the fine line between multivendor cooperation and antitrust infringement last week when it filed suit against the Open Software Foundation (OSF) and two of its members, Digital Equipment Corp. and Hewlett-Packard Co.

Addamax Corp. turned the Federal Trade Commission's recent investigations of possible OSF antitrust violations into formal litigation when it filed suit in federal court here last Tuesday. Seeking damages of up to $100 million, Addamax alleged that in creating the OSF/1 operating system, OSF and its two deepest pocketed members pooled their market power into an illegal cartel and conspired to fix software prices and set price ceilings.

"Antitrust applies when the goal of the charged party is specifically to restrain someone else's business," explained Edson Rafferty, a senior partner at Rafferty, Polich & Shaw, an antitrust and litigation firm in Cambridge, Mass. Rafferty is not involved in the case.

"Addamax will have to prove that this isn't just a reasonable attempt by a group of companies to get decent prices from competitors for different forms of software," he said.

Earlier rejection

Addamax is a 22-employee software development firm in Champaign, Ill. The company lost an OSF bid in December 1989 to Atlanta-based Secureware, Inc. for a security component to be bundled into OSF/1, which is being promoted as a Unix-based operating system.

However, Addamax was in a "lose-lose situation" whether or not its technology was selected, Addamax President Peter A. Alsberg said. "You can get chosen by OSF and make a little money [on license fees] or not get chosen and make no money. Your business dries up either way," he said. OSF'a combined-vendor muscle edges small software vendors out of business, constituting antitrust violations, Addamax claimed.

The Cambridge-based OSF is a consortium of computer vendors and users that selects and blends technologies from various manufacturers into what it deems an "open" software environment, then resells it to computer manufacturers. Alsberg said the OSF was only going to pay "six figures" to license Addamax's B1st System security technology if it were chosen as a component for OSF/1 — not even one-tenth of the product's development cost.

Alsberg said the "lose-lose" scenario applies to the independent software community in general. However, Secureware Chief Executive Officer Michael McChesney said sales of his SMP+, which beat out B1st, have tripled since the OSF selection.

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Kodak imaging added to Notes

BY PATRICIA KEEFE
CW STAFF

Lotus Development Corp. and Eastman Kodak Co. announced plans last week to add Kodak's document image processing technology to the Lotus Notes workgroup environment.

Under the agreement, Kodak will integrate its imaging technology, including image capture, storage and management, into Notes. This will enable users to import images, such as paper documents, fax transmissions and microfilm, directly into Notes applications. It will also extend Notes' integrated access to paper information sources.

"Image-enabled" Notes will be composed of Lotus Notes and Kodak-owned "Imageware." It will be packaged, distributed and supported solely by Lotus in early 1992. A prototype system is scheduled to be shown at this week's 1991 Association for Information and Imaging Management conference. Pricing details were not available.

Potential benefits

The nonexclusive partnership is expected to provide a significant improvement in price/performance in imaging systems and to open the imaging market to a broader range of users. Imaging systems typically run on separate, more expensive high-end systems. Kodak sees Notes as a way to bring imaging into the mainstream computing environment and, more specifically, to desktop users.

Craig Goldman, a vice president at Chase Manhattan Bank NA, said he needs "industrial-strength" imaging to round out his Notes-based technical platform.

"Up until now, imaging has been weak," he said, referring to the process of scanning in individual documents and storing them on network servers. Goldman said he expects an image-enabled Notes to open up access to back-office and peripheral information, allowing him to integrate that data into Notes. Currently, he has to use an "extremely awkward" stand-alone product, he said.

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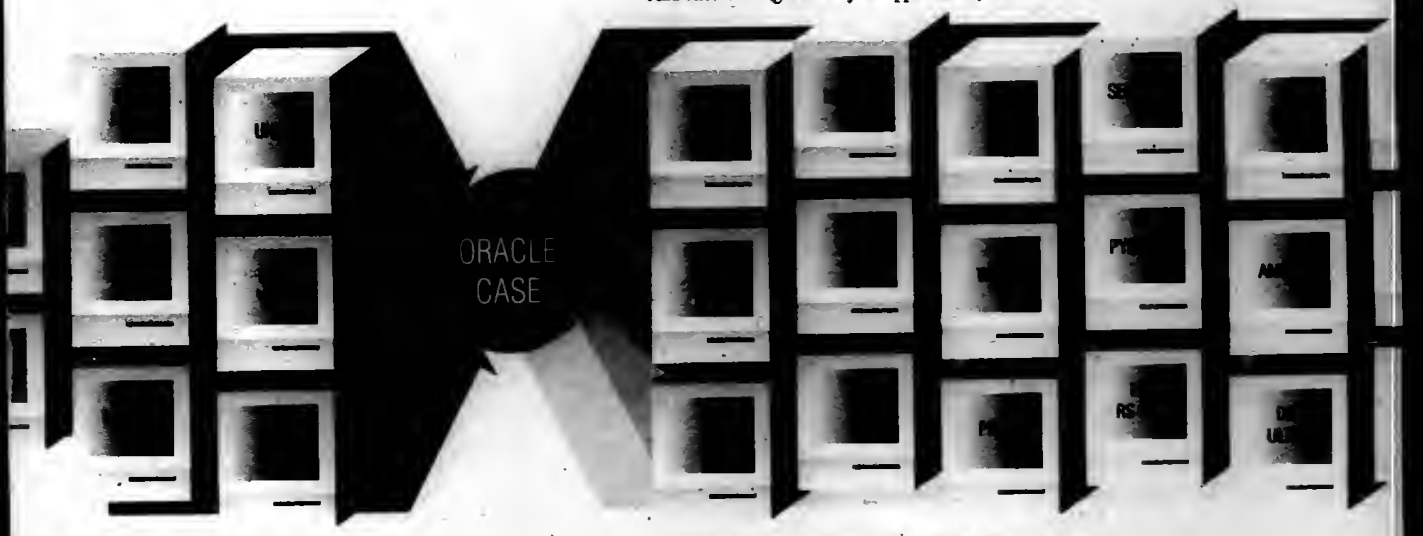

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Murder, he wrote?

BY CHRISTINE CASATELLI
SPECIAL TO CW

ALEXANDRIA, Va. — A standard government-issue floppy disk may hold the key to the death of a U.S. Marine Corps officer whose husband is on trial for her murder this week in federal court.

Robert Russell is charged with the killing of U.S. Marine Capt. Shirley Gibbs Russell, who was reported missing from the Quantico Marine base in Virginia on March 4, 1989. Although no body has ever been found, government prosecutors have established a case of premeditated murder based on a 26-step plot found on the defendant's floppy disk at work labeled "Murder."

The case, which marks the first time federal murder charges have been lodged against a defendant without a body being recovered, began Tuesday and will continue throughout this week.

Robert Russell, a 34-year-old former Marine captain, was relieved of duty in 1988 for falsifying documents during his assignment at the Marine base in Gulfport, Miss. While clearing out his office, co-workers went through his computer files looking for "mission-essential" information, a government witness testified.

Finding a file named "MURDER," they called it up, thinking it was a computer game. What they stumbled onto was a file that they believed outlined the perfect crime. "Alibi/excuse from work," the file read, "Make it look as if she left." The list of things to do also included "How do I kill her????" "Make sure car appears to have had problems," "Check in library on ways of murder — electrocution??" and "Blame it on her own kind." Robert Russell is white, and Shirley Russell was black.

At the time, Marine investigators who were alerted to the incriminating file brushed it off because Shirley Russell was alive and well and stationed in Parris Island, S.C. It was not until she disappeared the following year that interest in the 5¼-in. floppy disk was renewed.

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HP, Safari laptops out

BY MICHAEL FITZGERALD
CW STAFF

As expected, one tiny — and one sexy — portable computer hit the streets last week. Hewlett-Packard Co. and Lotus Development Corp. announced their joint development, the HP 95LX, and Safari Systems, the joint venture of AT&T Computer Systems Division and Marubeni America Corp., introduced its laptop.

The 95LX, an 11-ounce, 6.3-in. by 3.4-in. by 1-in., $695 palmtop IBM Personal Computer XT-compatible, runs for up to two months on two AA batteries and comes with 512K of random-access memory, 1M byte of read-only memory (ROM), a flash memory drive, a 16-line LCD and a Qwerty keyboard.

Lotus' 1-2-3 Release 2.2 spreadsheet is bundled with the device, along with Microsoft Corp.'s DOS 3.22, both built into ROM. Other functions include an HP advanced financial calculator, a telephone directory, an appointment calendar and a memo pad.

The 95LX also features an infrared link for data transfer with other 95LXs as well as built-in file transfer communications features and a serial port for RS232C devices such as printers and modems.

In addition, HP confirmed it is working with Motorola, Inc. to allow the 95LX to use Motorola's upcoming Electronic Mail Broadcast to a Roaming Computer technology.

Safari's 7.3-pound NSX/20, perhaps the sleekest laptop available in terms of design, was also announced. The Safari began shipping two weeks ago [CW, April 22].

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time, I say, "Blame, you know what that ring is?

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didn't hear this last part, as he was down the hall

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Citibank breaks ISDN ground with global lines

BY JOANIE M. WEXLER
CW STAFF

NEW YORK — Citibank said last week that it is likely to become the world's first user of pure, worldwide Integrated Services Digital Network (ISDN) technology when its global ISDN lines kick in next month.

In a move that is the closest thing yet to the technology in its intended form, Citibank installed the initial five U.S. ISDN lines last week and will have another seven running to its overseas offices in May with the goal of "improving real-time, interhuman communication" and reducing expenses, said David Isherwood, vice president of Citibank's Global Systems Division.

Citibank has become the first ISDN customer of bypass carrier TC Systems, Inc. TC Systems, the switched services subsidiary of Teleport Communications Group, said last week that it is now making basic-rate (144K bit/sec.) ISDN generally available and will provide the local ISDN portion for linking New York sites to Europe and the Far East.

Citibank's basic-rate traffic will spill from TC Systems' network into AT&T's primary-rate (1.5M bit/sec.) long-haul ISDN network, then switch back to basic-rate lines hooking into Citibank offices in London, Brussels, Singapore and Dusseldorf, Germany. Isherwood said all the foreign locations participating have basic-rate ISDN service available.

Until now, ISDN lines have not generally been available for every leg of an international trip, forcing users to give up some ISDN features at some point along the way.

Isherwood explained that Citibank is initially using the dial-up, integrated voice and data features of ISDN for "shared desk" applications. He said that using a single line to provide PC-to-PC file transfers while simultaneously discussing and editing on-screen text and graphics will help control costs by reducing the number of international business trips.

TC Systems' unregulated pricing is competitive with New York Telephone Co.'s tariffed service, Isherwood said, which was not available when he decided he needed ISDN. He said he would ultimately like to use the ISDN services of both carriers for redundancy.

The only investment Citibank has made, Isherwood said, has been in NCR Corp. personal computer ISDN adapter boards. He said the boards compare in price to high-speed modems and that he does not expect his monthly telephone bill to change much.

"The bottom line is that as a global systems division, we consider ISDN to be of profound interest to us," he said. "We're finally getting ISDN as it's supposed to be — like a telephone service. That's been the wish for many decades."

Bull mainframe announcements open doors for large-systems users

BY SALLY CUSACK
CW STAFF

BILLERICA, Mass. — Groupe Bull announced four new models of its high-end mainframe family, giving existing GCOS users more upgrade options and giving other Bull large-systems clients a lower price entry point to 9000 technology.

The high-end systems, based on NEC Corp. chip technology, come at a time when NEC is negotiating to acquire a portion of Bull, according to an official at the ailing French company. NEC currently owns 15% of Bull's U.S. subsidiary, Bull HN Information Systems, Inc.

The entry-level DPS 9000/61 is a single-CPU-based machine. The company also introduced the DPS 9000/62 dual-CPU platform.

Both systems offer 128M bytes of main memory and one I/O processor with 64 physical channels and an I/O capacity of 96M byte/sec.

At the higher end, Bull unveiled two machines. The 9000/62T has 256M bytes of memory, expandable to 1,024M bytes, and two system control units, and the 9000/92 has 128M bytes of main memory expandable to 512M bytes.

Prices for the new mainframe systems range from $3.9 million for the entry-level 9000/61 to $9.37 million for the high-end 9000/92.

One customer has already taken delivery on the large system. Braxton Vick, senior vice president of corporate services at Carolina Freight Corp. in Cherryville, N.C., recently installed a DPS 9000/62T, giving the company 13% more processing power than the DPS 90/93 and 90/91 systems it replaced.

According to Vick, the dual-CPU system will allow Carolina Freight to run both batch and real-time systems applications on a single machine. Previously, the transactions were executed on separate systems, he said.

The 9000/62T provides two I/O processors, each capable of supporting 64 physical channels and offering a combined I/O capacity of 96M byte/sec., while the 9000/92 can be expanded to two I/O processors with a total of 128 physical channels and 192M byte/sec. of I/O capacity.

A viable competitor

"Groupe Bull, as a distributor of NEC products, bears watching. NEC could come back as a force in the mainframe market," said Frank Gens, vice president at Technology Investment Strategies Corp., a market research firm.

According to Patrick Marx, director of international press relations at Bull, the French company is looking to streamline its European organizations and create greater harmony between Bull HN and the Paris-based parent company.

While a spokeswoman for NEC declined comment, Marx said that the apparent resolution would most likely take form in some type of share swap on a prorated basis.

HP introduces hybrid laser/fax

BY J. A. SAVAGE
CW STAFF

SAN DIEGO — A peripheral that acts as a laser printer and a fax machine is being introduced today by Hewlett-Packard Co. Through the Laserjet Fax, documents can be sent either from a personal computer or from hard copy and printed on a Laserjet printer.

"We're expecting to see more of these integrated peripherals hitting the market soon," said Marc Boer, an analyst at BIS Strategic Decisions, a consulting group in Norwell, Mass. He said the Laserjet Fax is the first of its kind. "But all the major vendors are looking into it," he added.

Aida the Laserjet

The Laserjet Fax works as a facilitator of plain paper faxes, which are then printed on an HP Laserjet printer. It is cabled between the PC and the printer. It is not a stand-alone peripheral because it does not have a printer engine, but it sends faxes to the printer, according to an HP spokesman.

Boer said using this "bridge" peripheral strategy instead of introducing a stand-alone machine is a good method for entering this embryonic market.

"There are 2.5 million HP Laserjets out there that can use this thing," Boer said.

Laserjet Fax prices begin at $1,895.

Fax potential

Hewlett-Packard Co.'s fax product was designed to tap into the large installed base of Laserjet printers

Number of U.S. shipments

1988	
Laserjet Series II	406,000
1989	
Laserjet Series II	600,000
Laserjet Series IIP	160,000
1990	
Laserjet Series II and III	350,000
Laserjet Series IIP	735,000
Laserjet Series IID and IIID	55,000

Source: International Data Corp. · CW Chart: Marie Haines

Graphics show turns to Windows

BY ELLIS BOOKER
CW STAFF

CHICAGO — The 12th annual National Computer Graphics Association (NCGA) show last week appropriately carried the theme: "We're doing Windows."

But graphics software developers at the three-day show admitted the Microsoft Corp. Windows 3.0 phenomenon had less to do with the environment's technical capabilities than with its position at the top of the software sales charts.

"They've promoted the hell out of it . . . so we have to have it," observed one vendor, who asked for anonymity.

Windows 3.0 was seen in strength among the 180 vendors at NCGA '91, competing for space with the Apple Computer, Inc. Macintosh and a smattering of Unix end-user interfaces.

Statistics underscore the move to Windows 3.0. A survey by Sudbury, Mass.-based Computer Graphics Research Institute found graphical user interfaces for the arts evenly split between Windows and the Macintosh interface, but "51% said they planned to move from DOS to Windows for presentation graphics," said Research Director Dan Baker. One year ago, only 13% planned a Windows migration, he said.

Unix processors made a strong showing, too. Hewlett-Packard Co. came to NCGA with its recently introduced HP/Apollo 9000 Series 700 family, and IBM showed high-end graphics on its reduced instruction set computing (RISC) workstation, the RISC System/6000.

In addition, several companies announced board-level products to support the RS/6000.

But it may be an inopportune time to enter the high-resolution graphics board business. A recent report issued by Jon Peddie Associates Institute in Oakland, Calif., reported that 1990 sales of the boards were flat, with an expected 20% to 30% growth rate wiped out by a horrendous fourth quarter.

In other NCGA developments, Computer Associates International, Inc. announced ports of the Unix version of CA-Dissplа to IBM's AIX, Cray Computer, Inc.'s Unicos and Silicon Graphics, Inc.'s IRIX Unix implementations.

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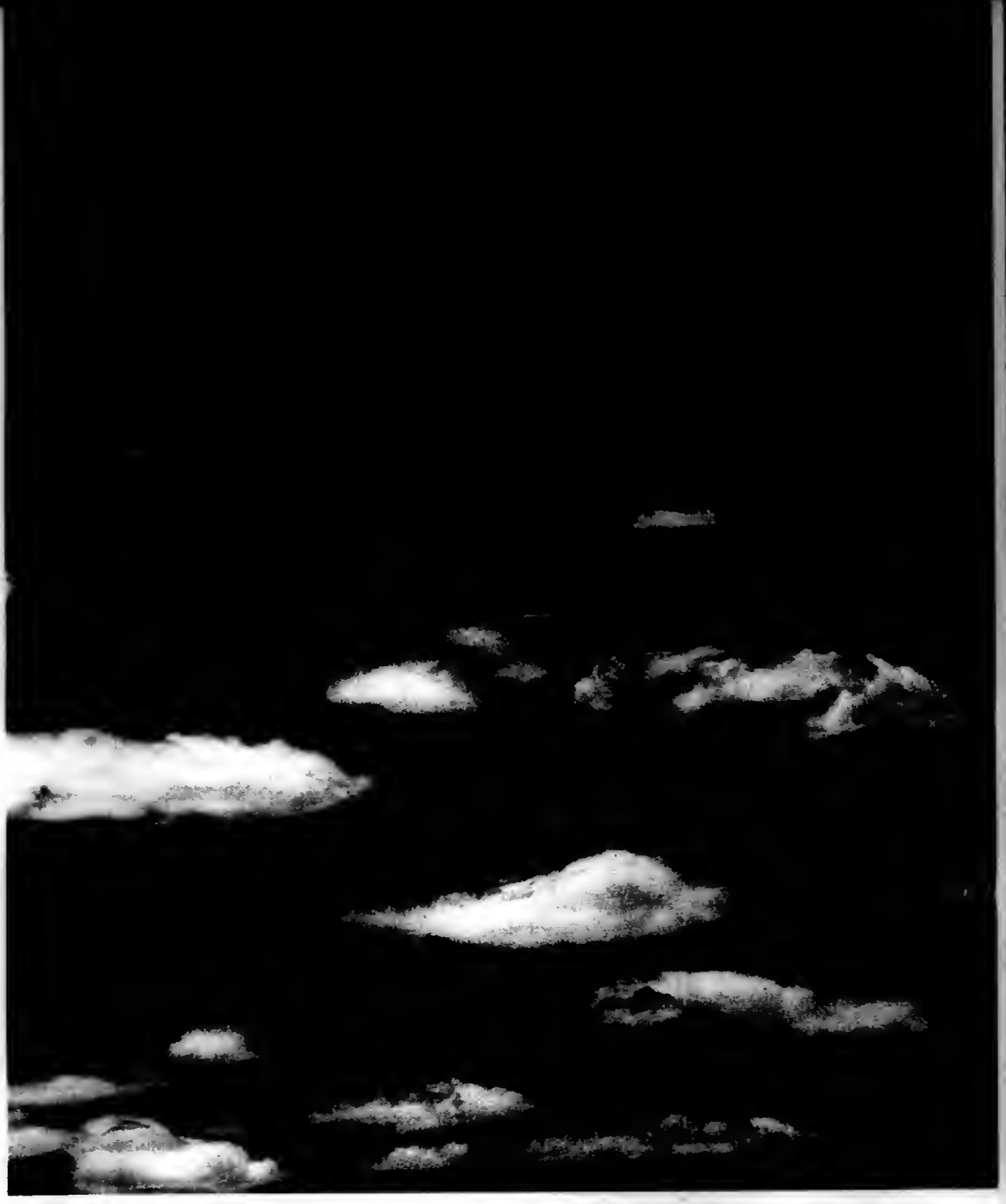

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TECH TALK

Customers call for help

■ NCR Corp. recently launched a nationwide radio data information service that relays customer service calls to field engineers within 45 seconds. A customer service request to a telephone hot line is keyed into a computer by an operator and then transmitted by radio waves to a field engineer's mobile handheld computer. The company said that 5;000 engineers will use the system to respond to service calls. NCR Corp. signed a $15 million pact with Ardis, a nationwide radio data information service provider.

Pumping up the heart

■ Researchers at the Illinois Institute of Technology in Chicago are developing a computer-controlled pump capable of sensing disturbances in the heart's rhythm and releasing small amounts of drugs into the bloodstream when needed. The disturbances, called arrhythmias, cause most of the 400,000 sudden cardiac deaths in the U.S. each year. Drugs for treatment are available but can be dangerous when taken orally for long periods. The pump system releases a drug into the bloodstream and then shuts off, thereby reducing the toxic effect of long-term, chronic oral drug use.

Computer combustion

■ Using a combination of supercomputing, animation and video recording, chemical engineers at the State University of New York at Buffalo have found a way to examine combustion reactions in production of ceramic materials. The researchers have developed the most complete picture thus far of combustion synthesis of inorganic materials, the rapid chemical reactions that produce ceramics from metal powders for use in automotive, manufacturing and aerospace applications. Combustion reactions are videotaped and studied on scientific workstations using specially designed modeling software.

Creepy, crawly heroes of the AI age

Researchers envision miniature robots cleaning house and clearing clogged arteries

BY JAMES DALY
CW STAFF

Attila is not particularly big or attractive and tends to whine when it walks around the room. But the time may come when Attila — a nimble six-legged robot — and miniaturized versions of the frisky automaton may be heroes of the electronic age, hopping around Mars, swimming through blood vessels or even tidying up your house.

"Can you imagine a little creature living in your home who wanders around picking up dust?" asks Colin Angle, a graduate student at MIT's Mobile Robotics Laboratory in Cambridge, Mass., where Attila was built. "Or you can let it outside and it could live in the tall grass, chopping it and keeping it short."

Insect robots such as Attila *currently serve as an exciting platform for robotics research, but practical applications are on the horizon*

Leading AI light

The shoebox-sized Attila is a leading light in what has developed into an exciting new chapter in artificial intelligence research. While AI scientists typically use complex programs to replicate the independent reasoning process humans perform with ease, Angle used microprocessor-equipped legs with Attila to enact a simpler reactive behavior: a lowered leg knows it should go up, a raised leg knows it should go down. If the legs are not moving in a sequence that allows walking, the first microprocessor figures it should discourage its leg from lifting when other legs are raised. "Walking isn't all that difficult," Colin says, "because the robot has direct feedback when it lifts a leg vs. when it falls down."

This reflex-based design equips the robots with a basic intelligence level on par with that of a grasshopper or termite, hence their nickname: insect robots. "Insects accomplish incredible things using simple reactive and repetitive behaviors," said Anita Flynn, a graduate student and researcher at the lab. "Instead of trying to build subparts of a complex animal, we're building complete parts of very simple animals."

Behind this surface appearance of simplicity exists one of the most sophisticated microrobotic systems ever constructed. Attila packs 25 motors and 11 on-board circuit boards into a five-pound package. One hundred and fifty sensors can determine the lay of the terrain, surface texture, hardness and even color. Self-contained batteries allow up to 40 minutes of ambling time.

Scientists such as Flynn have proposed taking the research to another level by dramatically shrinking the size of the robots and replacing their conventional motors and batteries with tiny micromachines. "We can pack a lot of intelligence onto a tiny chip but often have to power the robots with diesel engines and air conditioners," she said.

Flynn's idea is to integrate the entire robot, from sensors to motors, onto one chip. The machines, dubbed "gnats," would be as tiny as one cubic millimeter and possess near limitless potential: They could explore distant planets, march up plant stalks and kill pests or clear clogged arteries after being injected into the bloodstream.

Although Attila and friends currently serve as a fascinating platform for robotics research, practical applications are on the horizon. Bruce Bullock, chief executive officer of Westlake Village, Calif.-based IS Robotics, Inc., said robots such as Attila could perform jobs that are too risky for humans.

"We could let camera-equipped robots go in a building where a bomb has been set or go down into a mine shaft or an area where there has been a chemical spill," he said.

Bullock also said he hopes to spur the acceptance of robots by lowering the cost of owning one. A machine as technically complex as Attila might cost $50,000. However, IS Robotics has produced a model called R1 that could sell for less than $1,000.

Reliability needs fuel fault-tolerance phenomenon

To err is human; to forgive is fault tolerant — Lawrence Bernstein, vice president of operations systems at AT&T Network Systems

BY MICHAEL ALEXANDER
CW STAFF

Is fault-tolerant computing the "designer label of the '90s?" According to Lawrence Bernstein, vice president of operations systems at AT&T Network Systems in Middletown, N.J., "It will have the same magic as computers and software did in the '60s, digital switching in the '70s and fiber fever in the '80s."

Computer users are becoming so dependent on computer technology that they are going to want their systems to be as reliable as their telephone, he said. Paradoxically, the failures of AT&T's own networks in recent years captured public attention so much because they were so unique. The notion that systems must be entirely failproof will be expected of all other systems, Bernstein said. "People don't think about the reliability of bridges in New York until they start falling down."

AT&T Network Systems' Bernstein

That refusal to accept downtime as a normal consequence of computer technology will force virtually every major computer vendor to offer fault-tolerant capability, at least as an option, Bernstein said. It will also lead to a shake-up in the ranks of fault-tolerant hardware and software vendors.

In addition to no unscheduled downtime, fault-tolerant systems offer users freedom from obsessive machine management, enhanced opportunity to manipulate processes and ease of expansion. Thus far, the four largest areas where fault-tolerant technology is used are the military, aerospace, telecommunications and transaction processing. That will change beginning in 1993 when the industry takes to fault-tolerant computing in a big way, Bernstein predicted.

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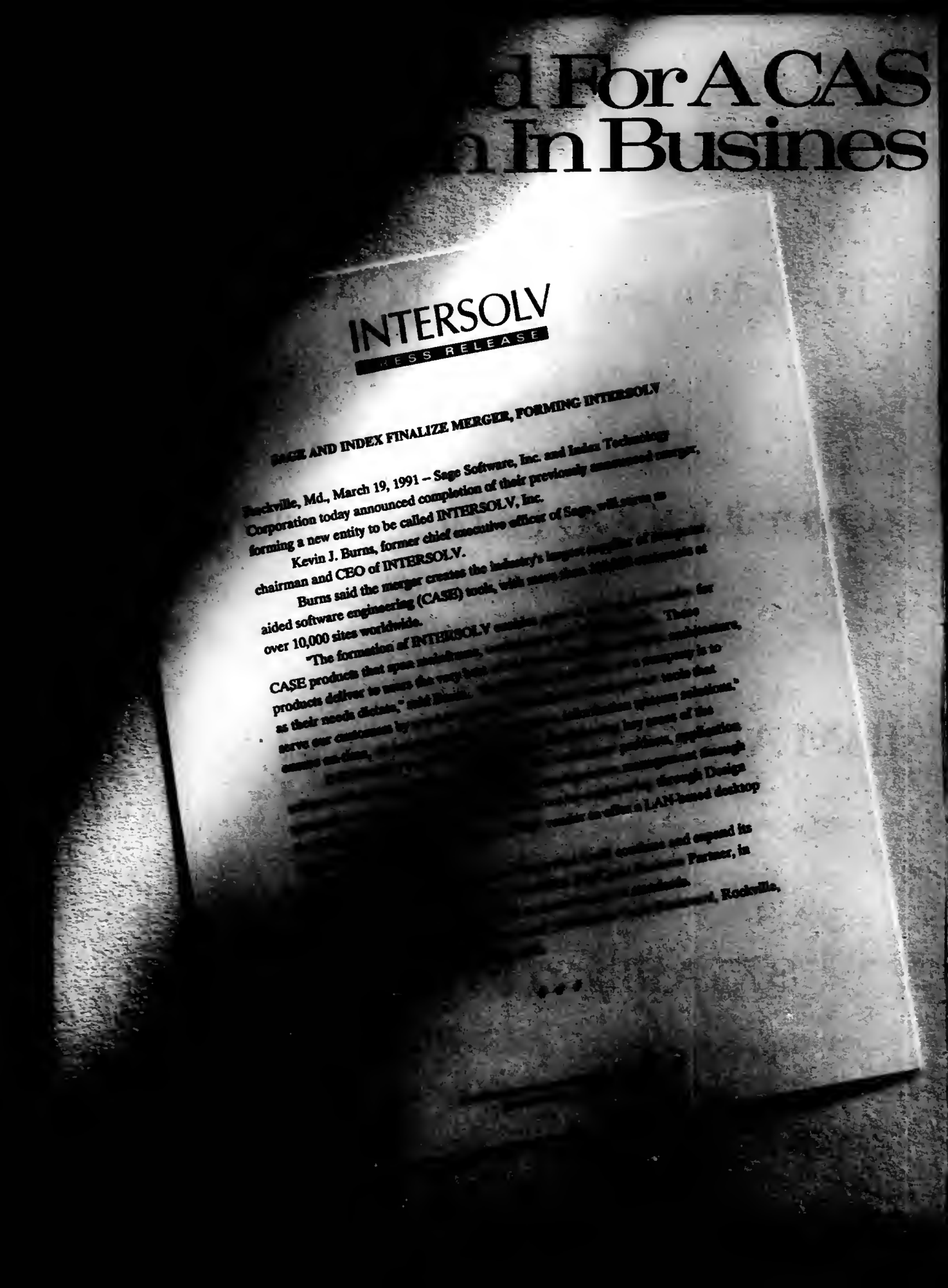
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RESS RELEASE
AGE AND INDEX FINALIZE MERGER, FORMING INTERSOLV
Rockville, Md., March 19, 1991 -- Sage Software, Inc. and Index Technology
Corporation today announced completion of their previously announced merger,
forming a new entity to be called INTERSOLV, Inc.
Kevin J. Burns, former chief executive officer of Sage, will serve as
chairman and CEO of INTERSOLV.
Burns said the merger creates the industry's largest supplier of computer
aided software engineering (CASE) tools, with more than
over 10,000 sites worldwide.
"The formation of INTERSOLV
CASE products that span mainframes,
products deliver to users the very best
as their needs dictate," said Burns.
serve our customers by
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These
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EDITORIAL

IS realism

OVERBLOWN EXPECTATIONS. Mistaken calls. Slow turnaround. Chief information officer turnover.

Gee-whiz attitudes and the blind pursuit of competitive advantage maturing into clear-eyed realism.

Cause and effect.

If there is one thing that is perfectly clear from our Executive Report today, based on interviews with 200 senior corporate managers, it is that the go-go years of information systems spending based on anything other than carefully documented justification are over.

Consider that, as in our first chief executive officer survey two years ago, a majority of those polled still don't think they're getting their money's worth for their investment in IS. In the U.S., that's a $200 billion annual investment, making IS the biggest beneficiary of capital outlays.

This statistic comes from a group that believes overwhelmingly that the benefits of IS are quantifiable. Yet they can provide few if any metrics to support this belief. "We don't even try," one chief financial officer said candidly.

So based on gut feeling and other subjective inputs to calibrate the value of the IS investment, the corporate elite are moderating their formerly inflated expectations of just what IS can do for the company. And they are parting with a lot of CIOs along the way.

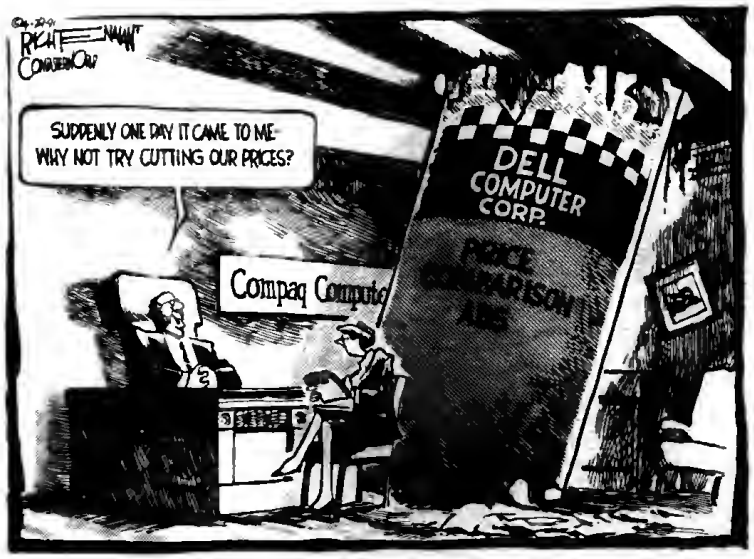
This is not to suggest that IS is not seen as playing a very significant role in the corporate success story. It very much is, as the survey shows.

However, the more sobering reality creeping into the corporate psyche, according to the survey, is that IS certainly won't buy corporate America the Holy Grail of competitive advantage (as just might have been represented by consultants, vendors and IS management).

Rather, they are embracing the management buzzword of the early 1990s, "re-engineering," in a most meaningful way. Simply put, just layering technology onto existing core business processes is a diminishing returns game. Those very processes have to be changed to accept and properly utilize the coming generations of super-high-performance microprocessor-based technology. That's the cold light of dawn striking corporate management.

For the IS executive, this emerging reality should be welcome in that it represents perhaps a more honest set of expectations of the IS function. On the other hand, this reality will also place a heavier burden of responsibility on the CIO to be a much more effective corporate team player while ensuring that the company gets every millimeter of advantage from the dizzying array of technology choices.

This requires that the CIO have, in the words of *Computerworld* Senior Editor Joseph Maglitta, "the technical brilliance of Charles Babbage, the business savvy of Bill Gates, the vision of Thomas Jefferson and the leadership abilities of Gen. H. Norman Schwarzkopf."



LETTERS TO THE EDITOR

All in agreement

I was extremely gratified to read your editorial of April 1, endorsing the repeal of Section 1706 of the Tax Reform Act of 1986. As a member of that select group of independent consultants who have, as you so precisely put it, been tarred and feathered by Section 1706, I agree completely with your stand. I, as well as my friends and colleagues of the Independent Computer Consultants Association, will continue to work to overturn this atrocious regulation. We are delighted, therefore, to have your support in this ongoing fight.

John T. Williams
Williams Software Services, Inc.

OS/2 gets bad rap

I was disappointed when I read "DOS seen through other windows" [CW, March 4], but I wasn't surprised. OS/2 has been misunderstood since the day it was released.

"Windows is configured to run pre-existing applications, while OS/2 Presentation Manager is not" is a really poor, confusing statement. The only sense in which the statement is true is if you mean that a DOS character application will display its characters in a window under Windows and not Presentation Manager. That is a far cry from what you said, which basically sounds like "Old applications will run under Windows but not OS/2."

OS/2 is a complete operating system designed from the ground up to reliably run multiple programs, be portable to different computers, use multiple processors and use large amounts of memory. Windows is not an operating system but instead depends on DOS, which does a terrible job at those things if it can do them at all.

The bottom-line conclusion is that it will take (more) years of unreliability; half-completed, half-baked half-measures; rewriting programs and buying upgrades; complexity in buying and installing computers; slow-running programs; and other types of pain to reach the same point we could reach in six months if programs were rewritten *once* to run under OS/2.

Russell Van Zandt
Systems programmer
The Old Second National Bank of Aurora
Aurora, Ill.

Mixed signals

Regarding the letter from Charles Wang [CW, March 4], I am increasingly amazed at Computer Associates' ability to twist the facts of its support for its products. In his letter, Wang stated that there would be no upgrade fee for CA's products running under VSE/ESA as long as ESA is not exploited. The problem is that people are not going to pay for ESA unless they are going to exploit the software. It appears that Mr. Wang has tried to convince the managers of VSE installation that there is no upgrade cost but while migrating, it would become apparent that upgrade costs would be incurred for CA's products. Unfortunately, that would come too late in the migration for it to be practical to change to hold down the future costs of upgrading.

I have spoken with several other software companies, and none of them are going to charge to make their products run on ESA. It makes you wonder if CA is more concerned about itself than the people who it is supposed to be serving.

Robert Fink
Systems programmer
Lakewood, Colo.

Misdirected blame

As an executive for Realia, Inc., it's evident where Marc S. Sokol's motivation originated for his recent commentary on "Mainframe programmers and the V-8 mentality" [CW, April 15]. While I concur with his observation that migration of application development from the mainframe to the PC has been inexcusably slow, his auto analogy places blame on the wrong drivers. Mainframe programmers typically have no more choice about the development platform than they do about the programming language (Cobol or Cobol).

Management is ultimately responsible for configuring the computing environment; the fact that they're reluctant to invest in the resources and training for a new platform shouldn't cast a negative reflection on the lowly programmer.

Denise Modrick
Modrick Consulting
Collegeville, Pa.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

A diploma can't ensure ethics

If industry wants straight arrows, it must be willing to help form them

BY KAREN FORCHT

Computer security and computer-based crime have been the focus of substantial debate during the past decade. Yet, it remains clear that unethical behavior is common. This is a concern that educators and businessmen must address together.

Many professional groups are developing guidelines in this sea of uncertainty by proposing formal codes of ethics. Such guidelines are a crucial starting point, but they are not enough. Businesses, particularly those in the computer industry, must get more involved in the process of educating future computer professionals about the standards of conduct they will be expected to uphold after graduation.

Two surveys recently conducted by James Madison University make very clear that greater collaboration between the business and educational sectors is necessary if companies truly want employees with high ethical standards. Both surveys were designed to study ethical awareness and practices. One concentrated on business executives in the computer industry; the other on college students.

In the business practitioner survey, a questionnaire was mailed to the chief executive officers of 100 major hardware, software, peripherals and computer service companies. For the most part, the CEOs responding said they adhere to a high standard of personal ethical conduct and computer use. Furthermore, they expect their employees to follow ethical standards. This ethical attitude is reinforced by ethics codes, ethical awareness programs and sanctions or reprimands of offending employees.

When asked whether it was possible to teach ethical behavior in a classroom as opposed to on the job, however, more than 75% said they felt ethics could be acquired in a classroom setting. Based on the results of the student survey, this may be a dangerous assumption.

The student survey mainly targeted business students — sophomores through MBA students. Most of them had previous computer experience in the workplace, ranging from data entry and word processing to operations and specialized internships. When asked if they had engaged in any form of illegal computer use, whether software piracy or some form of hacking, almost half admitted to using the computer for unethical purposes.

Students majoring in accounting and computer information systems are most aware of formal ethical statements and honor codes. Alarmingly, though, while computer IS majors and MBA candidates are aware of the ethical concerns, they also represent the largest segment of student hackers among the survey sample.

Bob Dahm

This finding should cause great concern because these future consultants, bankers and government officials will be working with extremely sensitive information and yet their ethical standards are lacking at this early stage in their careers.

A comment from one of the student respondents shed a great deal of light on the ethics dilemma that is facing education and industry: "I think today, more than ever, students are learning that it is more practical and safe to use the business ethics that they are taught while still in school. However, many times when the students get in a real-world situation, they may feel that they have to do certain things just to stay competitive."

Survey responses indicated that computer industry executives do not condone such compromises and want to hire employees with high ethical standards. What these executives need to realize, however, is that they cannot depend on colleges and universities to do the whole job of ethical education.

For one thing, not all professors espouse the same values, and it is therefore easy for students to receive mixed messages about what is ethical computing behavior. Some professors view hacking as an intellectual pursuit, rather than a serious transgression. Those of us who disagree with that assessment can and do say so, but that does not mean the students believe us when we say that such behavior is not tolerated in business.

If that message is going to get across, it has to come from practitioners; from those who make the hires and set the codes for the workplace. We need you to testify to the value that you place on ethics through direct action.

Support your local university — the one you hire from — by opening your company for field trips or by venturing onto campus to share your values with the students. They need real-life evidence that ethical compromise is not the way to get ahead. From our lips, talk about ethics sounds like ivory tower philosophy. If they hear it from you — loud and clear — chances are they'll start taking computer ethics more seriously.

Forcht is an associate professor of computer information systems at James Madison University in Harrisonburg, Va. She was the 1990 National Computer Educator of the Year.

Want to score big? Learn to carry the ball

BY GEORGE T. SHAHEEN

It's a fact of life. Chief executive officers around the country are tightening their grip on information systems spending and directing more scrutiny at bottom-line justification.

Companies are tightening the clamps for a variety of reasons, from increased competition to the weak economy. But the core problem is that many CEOs aren't satisfied with the bang they are getting for their IS buck.

There's a reason for this: Technology is too often applied in isolation from other parts of the company. It's like digging for gold in one spot. If we don't discover gold, we just keep digging — redoubling our efforts to go deeper, faster. But, if the gold is 20 feet to one side, then we can dig forever without finding it.

The answer is to use technology as the catalyst for business process change, rather than as an end unto itself. And chief information officers should be sounding the trumpet for this approach — acting as "change agents" and leaders pushing for new ideas and directions. We all know that every idea needs a champion if it's ever to get off the ground. CIOs have to serve as the champions for this vision of technology's potential.

Making a real difference

The ultimate test of practical leadership is change that meets people's needs. The bottom-line result of being a change agent is that the organization is substantially improved. A real difference can be seen, felt and measured. The point is not just that a new system is installed but that the new system is in use and making things better for everyone. It's not just that there was a reorganization but that the new structure made a difference. It's not just a creative solution but the implementation of that solution.

Every good leader has, or should develop, the ability to envision the future — the ability to close his eyes and create a mental picture of what he hopes to accomplish. For the CIO, this may include asking himself what role he sees IS playing in his company next year, in five years or beyond. How would it operate? What will its priorities be? What will have changed?

Football coach John Madden tells of a conversation he had with famed coach Vince Lombardi about the differences between a good coach and a bad coach. Lombardi said: "The best coaches know what the end result looks like, whether it's an offensive play, a defensive play or a defensive coverage. If you don't know what the end result is supposed to look like, you can't get there."

What holds true for good coaches also holds true for good leaders when envisioning their future.

For many of you, your vision of the future will be one in which the vast resources of information technology are fully exploited by your firm. A vision where users get the right information when they need it; where the competitiveness of your firm is greatly enhanced by the information you provide; where your IS goals are aligned with overall corporate goals; and where software is developed and improved to break the status quo to reshape business processes.

Achieving the vision

As I see it, there are four key areas of preparation for achieving that vision.

First, the CIO must become the strategic planner for IS, aligning it with corporate goals. If this sounds like common sense, that's because it is. Most good ideas are. Hopefully, many of you are already well on your way in this direction.

Second, the CIO needs to instill confidence among senior management in your ability to manage change brought about by IS. This is where you put your skills as a change agent and leader to the test. You need to let your organization know that you are a key professional member of the team and that you can get the job done right.

Third, a good CIO will be able to demonstrate continued ability to handle current challenges. That means keeping your house in order — delivering new information systems on time, on budget and on target in terms of meeting business needs. You need to prove that IS has the skills to handle what's on its plate now, before getting the nod to tackle more complex challeges.

Finally, the CIO should show how the company's information technology investment is being optimized. Don't shy away from letting others know the benefits and successes the IS function has helped to create — how systems are improving productivity, how time and money are being saved and how better information is getting into the right hands more quickly.

It is imperative that the CIO demonstrate value for the dollars spent. Otherwise, IS will be viewed as a mysterious technological black hole where money vanishes, never to be seen again.

The CIO will continue to hold one of the most challenging and critical positions in the organization. However, major shifts are occurring on all fronts — in technology, human resources and business strategy. To address these concerns effectively, the CIO must be recognized as a leader companywide, taking a view that embraces the whole enterprise.

Shaheen is a worldwide managing partner at Andersen Consulting.

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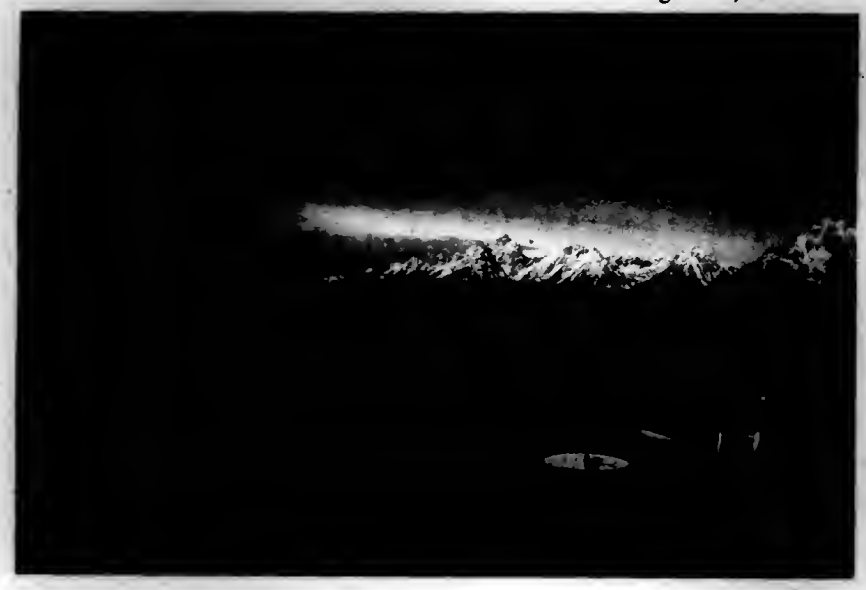

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The Usual Limits Don't Apply.

COMMENTARY

Teresa Elms

Side road to success

By the light of conventional wisdom, IBM's Application System/400 minicomputer should be a machine in trouble. Squeezed between ever-more-compact mainframes and ever-more-powerful personal computers and workstations, the AS/400 also competes with popular Unix-based minicomputers in a fierce war for commercial computing turf. Worse, the AS/400 is spurned as a migration platform by a significant portion of IBM's System/36 customer base — the single largest target market for AS/400 sales.

Yet Elms Information Services Group estimates 111,000 AS/400s were installed by December 1990, and we project a worldwide installed base of 154,000 systems by the end of this year.

So what's really going on with the AS/400?

First, as AS/400 users have been arguing for years, IBM's midrange computers are not just for midrange computing anymore. Last week's announcement of the powerful AS/400 D models makes the point with a high-end, dyadic processor AS/400 Model D80 that extends well into the 3090

Continued on page 36

HP explores IBM mainframe market

BY J. A. SAVAGE
CW STAFF

Sensing an easy target in the moribund IBM 4381 mainframe market, Hewlett-Packard Co. has assembled a special sales force to sway IBM midrange users to jump ship. While the company will not give unit figures, officials said it is meeting with some success, not only in the 4381 market but in some 3090 sites.

"A lot of our success is throwing out old applications because they're so old they'd have to be rewritten anyway," said Richard Sevcik, general manager of HP's Commercial Systems Division.

For Norman Moore, vice president of management information systems at Macleod-Stedman, Inc. in Winnipeg, Manitoba, the chance to replace old software was motivation for replacing an IBM 4381 and a Bull HN Information Systems, Inc. DPS 7000 with HP equipment. Some of the software running in the data center at the hardware and variety store chain was as much as 17 years old.

Macleod-Stedman went to HP when the firm consolidated its headquarters this January. "No doubt there are substantial savings, primarily in software maintenance," Moore said. He estimated software maintenance costs about $400,000 per year on the mainframes but only about $40,000 per year on the two HP computers, an HP 3000 Series 960 and a 922LX.

George Russell, director of IS at Gates McDonald, a subsidiary of Nationwide Insurance Co.,

> "NO DOUBT THERE are substantial savings, primarily in software maintenance."
>
> NORMAN MOORE
> MACLEOD-STEDMAN

said he went from IBM 3090s to HP computers not just for the cost but for better response times and a competitive edge. The flexibility of the client/server environment allows the firm to customize its services.

The Columbus, Ohio-based claims processor used to share its parent's mainframes, according to Russell. "We didn't see much responsiveness, and we needed more flexibility because each company we process claims for has its own demands."

The change was not undertaken lightly, Russell said. "It scared me for a time. We had to do a total rewrite of the applications." But his two HP 3000s — a Series 935 and a 960 — are making up for the costs in time-share savings, he said. More importantly, Russell said, it has brought power to the individual worker in a client/server mode.

Sevcik said the recession is helping HP get into what has been IBM territory. "We're seeing more cost-sensitive customers than there used to be." He estimated that HP minicomputers can offer about half the cost of ownership of 4381s.

Pyramid gains speed, lacks software

BY J. A. SAVAGE
CW STAFF

MOUNTAIN VIEW, Calif. — Pyramid Technology Corp.'s new Unix and reduced instruction set computing (RISC)-based computers have mainframe speed but not the robust set of system software to which mainframe users are accustomed.

In its new models, the Mi-server S series, based on Mips Computer Systems, Inc. RISC architecture, Pyramid has nearly doubled its computer speed. Its earlier T series topped out at 168 million instructions per second (MIPS). Its S series now runs a maximum of 300 MIPS.

However, company officials acknowledged that the kind of comprehensive mainframe management software available on IBM mainframes is lacking. "We have a project to provide that kind of support," said Mark Helfen, director of product marketing at Pyramid. "For instance, we will provide software to manage resources to assure that users get their correct share of system resources and allow the data center to charge back for its services." Pyramid said it expects to have that software within one year.

System software for the new computers currently addresses storage management and mirrored disks for high availability.

"I don't think Unix is capable of supporting [a complex data center environment], like one machine that runs 100 applications," said John Jones, an analyst at Montgomery Securities in San Francisco.

Large memory capacity

Like an IBM mainframe, however, it has large memory, CPU and I/O buses. The first two are 80M byte/sec., and the latter is 40M byte/sec.

The S series can be configured with up to 12 Mips RISC processors. It is the first computer to use Pyramid's implementation of AT&T's Unix System V Release 4. Pyramid's earlier T series uses the University of California at Berkeley's Unix Release 3 as an operating system.

Pyramid will concurrently sell its proprietary RISC architecture, according to Chief Executive Officer Richard Lussier.

Current Pyramid users can get board upgrades, but they cannot mix and match Mips and Pyramid processors within the computer, according to Ed Scott, executive vice president at Pyramid. Pricing for the S series begins at $93,000 and could top out at about $3.5 million, according to a spokesman.

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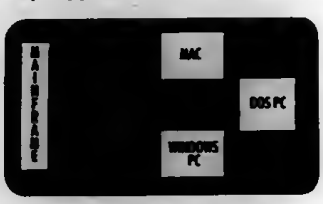

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Giving voice to 'intelligent newspapers'

DEC, Audiotechs use Decvoice to tie circulation, advertising databases into audio/video service

BY MARYFRAN JOHNSON
CW STAFF

Any lighthearted list of popular oxymorons is bound to include "military intelligence" and "postal service." Now computer technology has one to offer as well: "intelligent newspapers."

Coined and created in 1990 by the American Newspaper Publishers Association (ANPA), the intelligent newspaper has been more concept than reality. That may change, however, when Digital Equipment Corp. and Audiotechs, Inc. exhibit their new voice processing wares at an ANPA conference in early June.

DEC and Audiotechs, a start-up software company based in Newton, Mass., will be showing publishers how they can build this "intelligent newspaper" today on DEC's newly enhanced Decvoice voice processing platform, using Audiotechs' Audiokit tools.

News you can use

The idea behind the intelligent newspaper is to tie circulation and advertising databases into audio and video services. Media executives see it as a potentially rewarding way to extend the newspaper's usefulness to its readers by making information readily available by phone.

The more financially compelling reason, however, is the ability to offer added value to advertisers, said Stephen Reynolds, director of interactive media research at Link Resources Corp. in New York.

"There is a real evolution going on in the way the media, advertising and retail community relate to consumers — and how they reach those consumers," Reynolds said. "One of the trends we see is a true demand for personal information management, the desire on the consumer's part to have better tools to wade through information on a daily basis."

Voice services can give callers a range of options, such as replaying a classified ad or applying for a job by dictating their qualifications into a voice mailbox rather than sending them to a post office box.

People calling in for voice services generally remain anonymous, but newspaper executives are now pondering the marketing potential of tying those folks to a personal identification number — much like a bank card.

"You would identify who you are and a little bit about yourself. Then, as you use the service, your habits are tracked," said David Stotler, circulation marketing manager at the Houston Chronicle.

That tracking will, in turn, enrich the newspaper's customer database with the kind of specific information database marketers are hungry to get.

The potential for using voice services in conjunction with computers and their relational databases "opens up the possibility that voice systems can help feed and develop databases that the newspapers can use," said Paul Cohen, chairman of the advertising systems committee for the International Newspaper Advertising and Marketing Executives in Reston, Va. "The kinds of databases you can develop are only limited by your imagination."

While there are a score of audiotext and voice-mail products on the market now, they are specialized, stand-alone systems that cannot be easily linked to a general purpose computing platform without expensive customization. That is the vacuum DEC hopes to fill with Decvoice on its VAX 4000 and Microvaxes.

"DEC has a good track record, and their Decvoice platform has been noticed by newspaper publishers," Stotler said.

Reynolds noted that Decvoice is "the type of technology that is needed for voice processing services to evolve."

Audiotechs' Audiokit products, which will be available in June and run only on Decvoice, include modular tools and utilities for building and integrating the kind of voice transactions and audiotext applications necessary to put an intelligent newspaper on-line.

"The significant difference with Decvoice is its ability to tie the voice service to database marketing," said Howard Johnson, president of Audiotechs.

The market for voice services is still in its infancy, however. Services that are free to callers — such as stock quotes or baseball scores — generate about $173 million annually, according to Link Resources.

The larger market is in caller-paid voice services, which account for $690 million in annual revenue for 900 numbers and another $300 million for local 976 numbers.

Mainframe arena yields a few thriving pockets

BY CAROL HILDEBRAND
CW STAFF

The once-thriving mainframe market is becoming more barren as outsourcing, downsizing and consolidation make inroads on the territory of IBM and the plug-compatibles. But those mourning the decline of entire market may be missing pockets of fertile ground.

According to a survey by La Jolla, Calif.-based research firm Computer Intelligence, certain niches in the mainframe market are bucking the general decline. The survey, which broke markets out by Standard Industry Classification (SIC) groups, showed increases and declines in site growth.

Areas such as government, medical/education and data processing services showed more than 25% growth. The report attributed the rise in government sector spending to increased military spending during the '80s, while the medical sector growth was pinned to the overall growth of the field.

The outside processing field, while having an adverse effect on the overall industry site distribution, showed growth in its vertical market as demand has increased for off-site data processing and disaster recovery services.

"People have a tendency to say, 'Oh well, the base is shrinking,' and they take it verbatim across all SIC groups, and that's not true," said Jerry Berry, author of the report. "Some areas are declining, but others are actually increasing."

Big declines in banking and manufacturing are not surprising, according to the report, which attributed the former to the crisis in the banking and savings and loan industries and the latter to industry consolidation through mergers, acquisitions and closings.

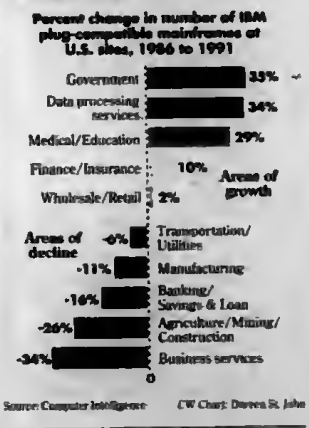
Berry said that another interesting detail was that the decline in mainframe sites does not mean a decline in processing power. While the firm charted an 8% decline in the number of CPUs and a 3% decline in the number of sites with IBM and plug-compatible mainframes, it also noted "a tremendous increase" in terms of processing power and storage capacity.

"The market has flattened off if you're just counting boxes or locations, but if you're looking at the power or the amount of storage, that's going up exponentially."

Berry said he believes this trend will intensify as mainframes are increasingly used for cooperative processing and distributed databases.

Full spectrum

Broad differences have sprouted up in the mainframe buying patterns of various industries, covering a range from 34% drops to 35% gains



Cotter revamps IS to cut costs, improve distribution

BY MICHAEL FITZGERALD
CW STAFF

CHICAGO — Cotter & Co., a $2.3 billion cooperative formed by the owners of True Value Hardware and V&S Variety Stores, is doing a lot of its own retooling these days in an effort to cut costs and get a better handle on distribution.

Cotter has increased its information systems budget by 50% in the past 15 months as part of a three-part program centered around new point-of-sale systems. The cooperative has also upgraded its 15 distribution centers from IBM System/38s to Application System/400s and is pushing heavily into electronic data interchange via satellites.

The short-term costs are high, but, "in the long run, our productivity is going to increase," said John Semkus, vice president of operations at Cotter. "We're going to be able to process information and run our business quicker, more accurately and with fewer people."

Semkus said Cotter began putting its plan for the future in place last year when it began to move its distribution centers off of the System/38s and onto the AS/400s. The company also met with Siemens Nixdorf Information Systems, Inc. and later signed a contract for point-of-sale systems that could be worth as much as $50 million.

Because Cotter is a cooperative organization, member companies can choose whether or not to automate and what platform they wish to use. Between 15% and 20% of the approximately 8,200 stores in the chain are automated in some fashion today. Cotter hopes to have 2,000 of its members using Siemens Nixdorf equipment by 1995. Since October, some 250 stores have chosen to use Siemens Nixdorf equipment.

Cotter is recommending that its members install an Intel Corp. 1486-based tower-style system running Unix, along with Intel 80386SX-based point-of-sale systems with a scanner gun, cash drawer and receipt printer. The boxes will ship with TruTrac, a software application developed by Cotter.

Steve Kirkwood, Cotter's director of MIS, said he expects to build applications to improve the entire order-entry process, create mechanisms for invoicing and making payments, sales and promotional management as well as reduce inventory.

Cotter has been looking into improving its point-of-sale methods for years, Semkus said, but could not find a vendor that could offer the combination of service, training and hardware price it wanted until it talked to Siemens Nixdorf.

Cotter uses satellite technology today to transfer data from its IBM 3090 200S in Chicago to its distribution centers. Eventually, that data will grow to include electronic data interchange between the home office and computerized member stores, Semkus said.

"It'll provide an electronic linkup with the source for data information [the corporate mainframe], so we can better recognize what's selling, and we can respond to that," Semkus said.

Semkus said the firm also has started a planned two-year project to develop real-time, bar code-driven control of its merchandise flow, using radio frequency equipment.

East Coast AIX users beginning to form groups

BY JOHANNA AMBROSIO
CW STAFF

Support groups for users of IBM's AIX operating system are springing up on the East Coast. When the Washington, D.C.-area AIX user group meets for the first time on May 30, it will join the ranks of two similar organizations that have already formed or are about to.

All three groups, including one in the New York/New Jersey area that will host its second meeting on May 21 and one forming in Boston in the fall, are sponsored by Princeton Information Ltd., a New York-based consulting firm.

IBM is providing meeting space for the groups but is lending no other financial support, according to Lester Marcus, Princeton Information's New York/New Jersey user group coordinator. "They did post notices about the group on their Natboard electronic bulletin board, and we got calls from IBMers all over the country," Marcus said.

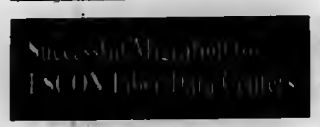
However, Marcus added, the focus is on reaching users and not IBM employees. "We've got 10 or 11 IBMers, and that's it — we're not accepting any more because this is a users' group."

At the first meetings, held on Feb. 5 in New York and on Feb. 6 in West Orange, N.J., about 90 people showed up from organizations including Aetna Life & Casualty Co., the city of White Plains and Ciba-Geigy Corp., Marcus said.

Up to 100 people are expected for the May meetings, Marcus added, which will include a roundtable discussion about how users begin to implement AIX. The panel will consist of three users and two IBM employees, he said.

Dues for the nonprofit user group are $45 per year, and that fee includes four meetings annually. "Nobody's making money on this," Marcus said. "If there's money left over, maybe we'll lower the dues for next year."

DataForum presents 4 free seminars on ESCON/Fiber Data Centers, Imaging, VTAM Performance and PC Security.



Data Switch Corp.

Migrating to IBM's System/390 ESCON/Fiber Channel architecture and how to maintain effective S/370-S/390 inter and intra data center connectivity is the essence of this seminar. Data Switch is a world-wide leader in connectivity and availability solutions.

Seminar Highlights and Benefits
- Migrating to the All Fiber Data Center
- IBM's ESCON/Fiber Channel Architecture
- Understanding the IBM ESCON Director
- Connectivity in the Distributed Enterprise
- Managing Mixed S/370-S/390 Systems
- Protecting Your System/370 Investment
- Creating Unlimited Distance Channels
- Data Switch Systems Interconnect Architecture
- Interconnecting Data Centers for Resource Sharing, Mirror Image Operations and Hot Site Backup
- Disaster Recovery Solutions
- Achieving Tangible ESCON Benefits at Minimal Cost

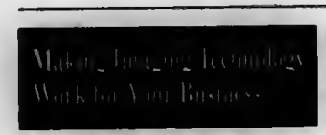
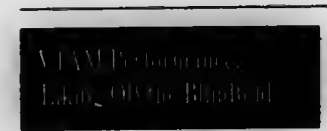


Image Business Systems

Manage your business, not your paper. Learn from an industry leader how documents converted to on-line electronic images can automate paper management and improve information processing. See several business imaging solutions demonstrated.

Seminar Highlights and Benefits
- Business Benefits of Electronic Documents
- Recognizing Imaging Opportunities
- Integrating Imaging into Daily Operations
- Overview of Architectural Approaches
- Selecting Your Best Imaging Platform
- Satisfying Standard and Unique Requirements
- Low Risk, Incremental Approaches to Imaging
- Open System Flexibility and Client/Server Design
- IBS's ImageSystem, Scalable to Your Needs
- ImageSystem Applications Demonstration



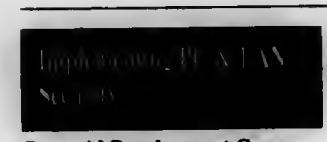
Landmark Systems Corp.

Network performance depends on VTAM behavior, not just MVS and its subsystems. Effectively managing VTAM is difficult, even for experienced network analysts. Landmark, a monitoring leader, explores this challenge and presents its solution.

Seminar Highlights and Benefits
- VTAM's Impact on Total System Performance
- The Network Performance Effects of VTAM
- Conventional Tools for VTAM Management
- New VTAM Management Strategies

(Not offered in Boston, N.Y. or Philadelphia)

- Explore VTAM Management Requirements
  - Managing Coattailing
  - Virtual Route and Buffer Pool Analysis
  - Balancing VTAM Message Distribution
  - ZAP,STARTUP & INDX Table Management
  - Managing Trace Activity
- Managing with The Monitor for VTAM



Pyramid Development Corp.

The world's leading supplier of PC security for large organizations explores how to establish mainframe-like security, standards and auditing on PCs and LANs. Included is a coupon redeemable for a free copy of PC/DACS security software.

Seminar Highlights and Benefits
- Security in Large PC & LAN Installations
- Controlling Access to Sensitive Information
- Matching Security to User's Needs
- Convenient & Unobtrusive User Security
- Consistency in Security, Audit & Control
- PC Virus Prevention versus Virus Detection
- Laptop Security Made Easy
- Flexible & Pragmatic Administration
- Novell & Other LAN Workstation Security
- Future Direction of Enterprise-Wide Security
- PC/DACS & Net/DACS Product Demonstration

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DALLAS	MAY 29	MINNEAPOLIS	JUNE 12	WASHINGTON, D.C.	JUNE 20

Standards body releases 4GL guide

BY GARY H. ANTHES
CW STAFF

GAITHERSBURG, Md. — The National Institute of Standards and Technology (NIST) has issued a guide for users who have narrowed their choice of a fourth-generation language (4GL) to a few contenders and need a reliable way to identify which one is best suited to their needs.

The 60-page booklet is the fourth report in the agency's series on 4GLs.

The methodology described in the report, "Functional Benchmarks for Fourth Generation Languages," is based on experience in using 10 commercial 4GL products at NIST's Computer Systems Laboratory. It is intended to evaluate functionality, not performance.

The report breaks the evaluation job into 200 tasks, with 4GLs assessed in terms of their ability to perform the tasks and their ease at performing them. For example, to test a 4GL's ability to create complex menus, the guide tells the evaluator to try 10 things, such as defining a menu with more entries than can be displayed on the screen at one time.

The methodology multiplies the resulting availability and ease-of-use scores by a user-specified weight that indicates the criticality of the function for the user's application. The result allows competing 4GLs to be ranked in order of overall suitability for that application.

THE REPORT BREAKS the evaluation job into 200 tasks, with 4GLs assessed in terms of their ability to perform the tasks and their ease at performing them.

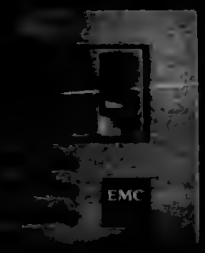
The procedure is actually step nine — "analyze top few in detail" — in a 10-step process described in an earlier NIST publication, "Guide to the Selection and Use of Fourth Generation Languages." The overall process recommends analyzing application requirements and then matching those requirements with product features gleaned from product literature, references, trade shows and the like.

Having narrowed a list of available 4GLs, users should buy personal computer-based versions of the top contenders for use in the NIST methodology, said Martha Gray, co-author of the report. Most can be had for less than $1,000, and that is a small investment to ensure making the optimum choice, she said.

"We were able to complete all the tasks in a few days for some of the products and in a few weeks for others," Gray said.

The book is available for $3.25 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The stock number is 003-003-03071-6.

Right.



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EMC's SL/936 Series is the only true alternative to the 9336 disk subsystem – and one that does more than give AS/400 users a choice. It gives them the performance, reliability and support that have made EMC's SL/Series the leading independent disk solutions for IBM midrange computers. And with immediate availability it gives them these advantages today.

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For more information on EMC's full line of midrange disk solutions for AS/400 and System/38 computers call 1-800-222-EMC2 ext. M131. (In MA call 508-435-1000; In Canada call 1-800-543-4782.)

EMC²

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If you've ever wished network management were less of a spectator sport, we have very good news for you. As the only T-1 provider with fully deployed ESF, AT&T ACCUNET® T1.5 Service can offer you just about any control solution you could need for use at any time, for any capacity or contiguous bandwidth.

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The right choice.

Elms

FROM PAGE 27

mainframe class.

By offering mainframe capacity and throughput with midrange economy and ease of use, the AS/400 becomes a complementary alternative to the mainframe rather than a machine without a mission.

AS/400 computing has become sufficiently attractive that even some established System/390 shops have converted their entire "glass house" operation to AS/400s. As much as 5% of AS/400 sales come from mainframe downsizing, according to industry analyst estimates.

However, it is not IBM's intent to cannibalize sales of its lucrative System/390 product line. Enterprise System/9000 users on the leading edge of that technology have such a substantial investment in hardware, software and staff that it rarely makes sense to discard it.

Rather, the growth of AS/400 capacity and performance reflects the growth of IBM's midrange franchise: the small-business sector. Successful small businesses grow much more rapidly than mature businesses, and their demands gradually start to resemble the demands of a large business.

A company may open branch offices or set up warehouses in several locations, each with its own computer resources interconnected via wide-area networks.

IBM has been hard-pressed to increase the capabilities of its midrange machines fast enough to keep up with user requirements — but it must keep up. Our research demonstrates again and again that IBM's midrange customer base would rather buy a DEC VAX than any species of ES/9000.

One key aspect of the AS/400's success has been its high "win" rate against competitive platforms as well as its expansion of midrange market share.

AS/400 revenue grew 12% in 1990, while the overall midrange computer market grew by only 4%. Application Business Systems, the IBM unit that makes the AS/400, contributed $14 billion to IBM's coffers last year — more than all the lines of business combined at the world's No. 2 computer maker, DEC.

Among its strengths are a highly integrated operating system that incorporates relational database management, the availability of 9,000 business application software packages and hardware and software reliability good enough to earn IBM's Rochester, Minn., manufacturing facility the Malcolm Baldrige National Quality Award.

IBM has also used the AS/400 to position itself for the first time as a technology leader in commercial midrange computing. A dedicated unit at IBM's Rochester lab — where AS/400s are designed and built — has spent the past three years enabling advanced technologies such as neural networks, expert systems and image processing for ready use in business applications.

Granted, you don't want to do rocket science on an AS/400. Nevertheless, IBM seems to believe that advanced technologies such as expert systems are sufficiently mature to add to the commercial programmer's bag of tricks.

Still, as IBM continues to grow, the AS/400 to take advantage of high-end opportunities, the system becomes vulnerable to erosion on the low end.

That "no-charge" database, for example, comes with OS/400 whether or not you want it.

The AS/400's entry price is consequently higher than the entry price for a basic Unix system. Furthermore, the AS/400 runs under a proprietary operating system, OS/400, that only partially participates in the movement to open systems through the adoption of international standards, documented application programming interfaces and IBM's blueprint for cross-system compatibility, Systems Application Architecture.

Despite thousands of screens of built-in Help text, the AS/400 is sufficiently complex to require at least one technical expert somewhere on the corporate staff. Small, turnkey System/36 accounts often refuse to hire that first technical expert. They migrate to multiuser PCs or local-area networks instead.

IBM's challenge for the remainder of the decade will be to grow its high-end AS/400 accounts without losing that low-end System/36 installed base. Toward that end, self-managing, self-diagnosing AS/400s with aggressive entry-level prices are already in the works. Stay tuned.

Elms is president of Elms Technical Communications, a market research and technical writing firm in San Diego.

Data service introduced

BY CHRISTOPHER LINDQUIST
CW STAFF

ORLANDO, Fla. — Dynasearch, an information retrieval firm, has introduced the Ultimate Knowledge Service.

Subscribers to the new service, intended for corporate chief executives and business owners, will be given fast, 24-hour-per-day, 365-day-per-year access to a large array of information sources customized to their needs and available in a confidential manner, according to company founder and Research Director Abner Weintraub.

Information for the service is taken from magazines and other publications, databases, surveys, market research and nearly any other source required by a subscriber. Subscribers can request information by telephone or fax.

Subscriptions cost $5,500 per year plus overnight delivery charges, telephone bills and fees for other such items. The number of subscriptions has been limited to 50 until Jan. 1, 1992.

The Power to See Outside Your World.

With its 200-inch telescope, one of the largest in the world, Mount Palomar Observatory can focus on stars not visible to the naked eye.

NEW PRODUCTS—HARDWARE

Data storage

Tense Lectronix, Inc. unveiled a disk array subsystem, the Legacy MASS Hot Fix Device.

Based on a small computer systems interface backplane, the device allows a user-specified configuration of up to eight half-height or four full-height storage devices, including hard and optical drives and tape backup units.

The Hot Fix Device with one 1.2G-byte hard disk costs $7,999. With four 380M-byte disks, it is priced at $13,799.

Tense Lectronix
200 Butterfield Drive
Unit B
Ashland, Mass. 01721
(508) 881-6442

Winchester Systems, Inc. has introduced a high-performance disk subsystem for the Digital Equipment Corp. VAX 4000.

The product uses a random-access memory cache. Flashdisk can reportedly perform up to 250 disk operations per second. Systems are available with up to 16M bytes of cache memory and 6G bytes of disk storage space.

Bundled software adds disk defragmentation, hot-file identification and file management.

Pricing starts at $7,495 for a 4M-byte cache system with 780M bytes of storage.

Winchester Systems
400 W. Cummings Park
Woburn, Mass. 01801
(617) 933-6174

Winchester Systems' *Flashdisk can reportedly perform 250 disk operations per second*

I/O devices

Avatar Corp. has added two internal cards to its Printer Emulation series of personal computer printer-to-mainframe connectivity products.

Passport-Plus and EP-Connect enable mainframe users to send data to a Hewlett-Packard Co. Laserjet printer or an Epson America, Inc. device.

Passport-Plus fits into the option slot of HP Laserjet II and III series printers and allows those printers to emulate IBM 3287, 3268 and 4224 system printers.

EP-Connect was designed for Epson's printers and features IBM 3287 emulation.

Each product costs $795.

Avatar
65 South St.
Hopkinton, Mass. 01748
(508) 435-3000

Power supplies

Sola Electric Co., a unit of General Signal Corp., has announced a series of uninterruptible power supplies designed to protect systems from brownouts and blackouts.

The CPS II series includes models that feature power ranging from 10 to 100 kVA for use in 50- and 60-Hz applications.

A front control panel displays data pertaining to critical operations. Pricing starts at $24,650 for a 15-kVA model.

Sola Electric
1717 Busse Road
Elk Grove Village, Ill. 60007
(708) 439-2800

Silicon Graphics announces real-time Unix features

BY J. A. SAVAGE
CW STAFF

MOUNTAIN VIEW, Calif. — Moving from the general to the specific, Silicon Graphics, Inc. today will introduce its first visual simulation system. The firm primarily makes general-purpose graphics workstations based on Unix.

Skywriter was designed for use in training simulation, such as piloting, where real-time response is crucial. Silicon Graphics has added a set of functions called React, for real-time access technology, to the Unix kernel to allow it to operate in real time, according to Joshua Mogal, product manager for the company's Advanced Systems Division.

React, along with specialized graphics hardware in the computer, will be brought into more general-purpose machines, promised Paul Koontz, director of graphics systems at Silicon Graphics. "As molecular modeling and creative graphics get more sensitive to performance in the next year or so, you'll see it in lower end systems."

Skywriter starts at $209,900, including two Mips-based parallel processors, two graphics pipelines, two monitors and basic memory.

Computer Power, Inc. has introduced its Trimax II smart series of uninterruptible power supplies. The products were designed to provide continuous power protection for mainframes and minicomputers.

The products accommodate loads ranging from 10 to 300 kVA and feature the CPI-232, a microprocessor-controlled diagnostic interface that enables managers to monitor the status of the power system and respond to problems immediately.

Pricing ranges from $31,598 for a 10-kVA unit with 35 minutes of runtime to $76,869 for a 300-kVA unit with user-specified runtime.

Computer Power
124 W. Main St.
High Bridge, N.J. 08829
(908) 638-8000

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S. 76

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HEWLETT PACKARD

SOFTWARE

Development tools

Cyberscience Corp. has released Cyberquery/Cyberscreen (CQCS), its fourth-generation language (4GL)/report writer tool kit, for Sun Microsystems, Inc.'s Scalable Processor Architecture platform.

CQCS incorporates integrated mail-merge, transaction processing and a graphics presentation module along with the 4GL and report writer. The product is environment-independent, allowing development of identical applications within Unix, VMS, AOS/VS and MS-DOS operating systems.

Prices for the full development kit range from $4,000 to $19,750.

Cyberscience
Suite 800
10065 E. Harvard Ave.
Denver, Colo. 80231
(303) 745-3900

On-Line Software International, Inc. has announced Release 2.0 of Ad/Vance Datamodeler, a mainframe computer-aided software engineering tool.

The product will be compatible with IBM's AD/Cycle strategy, according to On-Line. It is used for analysis, design and generation of DB2 databases. Included are domain and data type facilities and mainframe dictionary functionality.

Pricing is dependent on processor size. A license for an IBM Group Processor 50 costs $37,500.

On-Line Software International
2 Executive Drive
Fort Lee, N.J. 07024
(201) 592-0009

Applications packages

SDM International, Inc. has announced Release 4.0 of its OCM24/Transaction Control System, an electronic funds transfer software package designed for financial institutions.

The product runs on IBM MVS- or VSE-based systems under CICS and features an electronic reporting system that allows operators to store, retrieve and view on-line financial reports.

Pricing begins at $100,000.

SDM International
134 Spring Ave.
Fuquay-Varina, N.C. 27526
(919) 552-1100

Dynax Resources, Inc. has announced O/F Release 3.0, an IBM Application System/400 distribution/financial package.

The product comprises three modules. Added General Ledger functions include the ability to copy budgets from Lotus Development Corp.'s 1-2-3 personal computer spreadsheet files and to report in multiple formats. Accounts Payable and Accounts Receivable functions are also enhanced to handle foreign currency and streamline check processing, Dynax said.

Pricing is as follows for rack-mounted AS/400 systems: The General Ledger portion costs $15,000; the Accounts Payable, $12,500; and the Accounts Receivable, $12,000. For non-rack-mounted systems, each segment costs $3,000.

Dynax Resources
2 Jericho Plaza
Jericho, N.Y. 11753
(516) 932-9080

Utilities

Velocity Software, Inc. has announced a real-time monitor designed to analyze system performance and monitor data created by VM/XA and VM/ESA users.

Version 1.0 Release 3.0 of Xamon captures system performance data on disk or tape and extracts monitor data for use by Xamap, a VM/XA and VMS/ESA monitor analysis program.

The product is priced at $5,000. Xamap users can purchase it for $3,000.

Velocity Software
1242 Wasatch Drive
Mountain View, Calif. 94040
(415) 964-8867

Novadyne Computer Systems, Inc. has released the System On-Line Maintenance Executive (SOME), a diagnostic and disk utility that reduces downtime for the firm's Reality computer systems.

SOME, installed on-site but invoked via modem by Novadyne service engineers, interrupts operations for no more than 500 milliseconds while reassigning defective media.

The product is available free of charge to all Novadyne contract customers using Reality-based Series 18 systems (under Releases 6.0 and 7.0) and Series 6000 systems (under Release 2.3).

Novadyne Computer Systems
1775 East St. Andrews Place
Santa Ana, Calif. 92705
(714) 566-4810

Services

Level One Technical Support, Inc. has introduced a source-code recovery service.

The service reconstructs lost source code for compiled program objects written in Cobol, RPG II and RPG III under any release of OS/400 Version 1.

The cost is 30 cents per Machine Interface instruction if the template is present in the program object. If the template is missing, the cost is 45-cents per instruction.

Level One Technical Support
14438 Keese Drive
Whittier, Calif. 90604
(818) 894-3589

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It's estimated that more than half of today's Executive Information Systems fail*. So if you're thinking about installing a traditional EIS, think twice.

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- *Common graphical user interface (GUI)*
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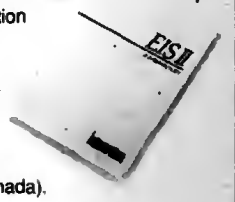
- Rapid implementation
- Low maintenance and support costs



For a free EIS II Information Kit, call **617-890-8717** (**416-221-2100** in Canada).

information resources inc

*David W. DeLong, co-author of "Executive Support Systems: The Emergence of Top Management Computer Use."

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COMMENTARY

Patricia Keefe

Do or die for OS/2

Now or never caught up with IBM two weeks ago, after the company caved in to user pressure and finally broke a prolonged public silence on OS/2.

Having complied, IBM's bid to place OS/2 on the desktop has entered the do-or-die phase. If OS/2 Version 2.0 doesn't fly, then IBM might as well spike any lingering hopes about becoming a major influence in desktop software.

On the surface, the IBM briefing didn't have a whole lot of new things to say. I mean, who didn't know that IBM was "committed" to OS/2? Anyone who cared to find out already knew a great deal about OS/2 2.0's feature set and that delivery is at least six months off. IBM has been pretty public about both points. And the idea that OS/2 might be a bit too pricey and bereft of useful tools is another bit of old news.

No, you have to look a little closer at the OS/2 hoopla. IBM is doing more here than just spending megamillions on the one hand and cutting price tags on the other. First, there is the level of involvement and concern evident within the highest echelons.

Continued on page 46

Windows 3.0A tackles UAE bug

BY JAMES DALY
CW STAFF

Three words strike fear into the hearts of hard-core users of Microsoft Corp.'s Windows 3.0: Unrecoverable Application Error (UAE). When that ambiguous warning flashes on-screen, it typically signals a crashing application, unwanted delays and probably a short burst of language unfit for a family newspaper.

To make matters more maddening, the UAE message appears on a wide variety of applications and its cause is difficult to pinpoint. The result is an uneasy foreboding as users wonder if they will walk down the same troubled path twice.

Relief from UAE nightmares, however, has arrived. For the past few months, Microsoft's Product Support Services group has quietly offered Windows 3.0A, a maintenance update offered on an "as-needed" basis that contains code rewrites, setup program improvements and an instructional booklet designed to offset frustrating UAE problems.

Additionally, Microsoft spokeswoman Cathy Licht said the changes inherent in Windows 3.0A have been built into Windows since November.

Although UAEs can occur anytime, users said the problems are most frequent when Windows 3.0 is pushed to its limits:

- While working with networking applications. Users may experience data loss and/or packet corruption problems in Windows network connectivity applications.
- During enhanced-mode dynamic data exchange (DDE), which allows sharing and updating of information between applications while using a personal computer equipped with at least an Intel Corp. 80386 microprocessor and 2M bytes of memory.
- Under low memory conditions. Operating Windows 3.0 under very low memory conditions can cause a UAE when program code is being swapped into and out of random-access memory from the hard disk.
- While printing. Most printing operations require a lot of memory to load drivers and prepare data output, causing Windows 3.0 to run low on memory. UAEs often result.

Another UAE case

Users noted that programs running in Windows 3.0 standard mode may also experience UAEs when protected-mode code calls into real-mode drivers, including 3270 emulators as well as fax board and scanner drivers. Version 3.0A fixes these problems.

Microsoft officials said users experiencing frequent UAEs should contact product support for advice about updating to Version 3.0A.

Windows 3.0A users said the fix smoothes out a lot of problems but does not completely eradicate them. "I've seen a lot of printing and DDE problems fixed, but there are still aberrations," said Joel Diamond, technical director at the Windows Users Group in Media, Pa. "I'm sure they're probably looking at a Version 3.0B by now," he said.

Graphic interfaces need artful programmers

BY ELLIS BOOKER
CW STAFF

Linda Black

CHICAGO — Workstations able to display 16.7 million colors; multimedia databases containing text, graphics, sound and full-motion video; and graphical user interfaces (GUI) that make the "system prompt" a thing of the past.

These technologies, which many believe are the future core of end-user computing, are putting new demands on software developers. Those developers must now create systems and interfaces as aesthetically pleasing as they are functional.

"[GUIs] have to visually pack a lot of information," said Ann M. Palermo, director of office systems research at International Data Corp. in Framingham, Mass. "If you look at an icon and have to ask, 'What's that?' it isn't working."

Applications developers are doing a better job with color and composition, Palermo said, because they are relying more on the advice of outside design consultants. "When people first started using color screens, there were some ghastly combinations," she recalled.

To improve his graphical sensibilities, Edward J. Gottsman took a basic drawing class. A manager at Andersen Consulting's Cstar research organization in Chicago, Gottsman recently completed the three-month class at the School of the Art Institute of Chicago.

"It sounded like a good idea in principle, but I couldn't quite hear myself explaining it my boss," said Gottsman, who paid his own tuition for

Continued on page 47

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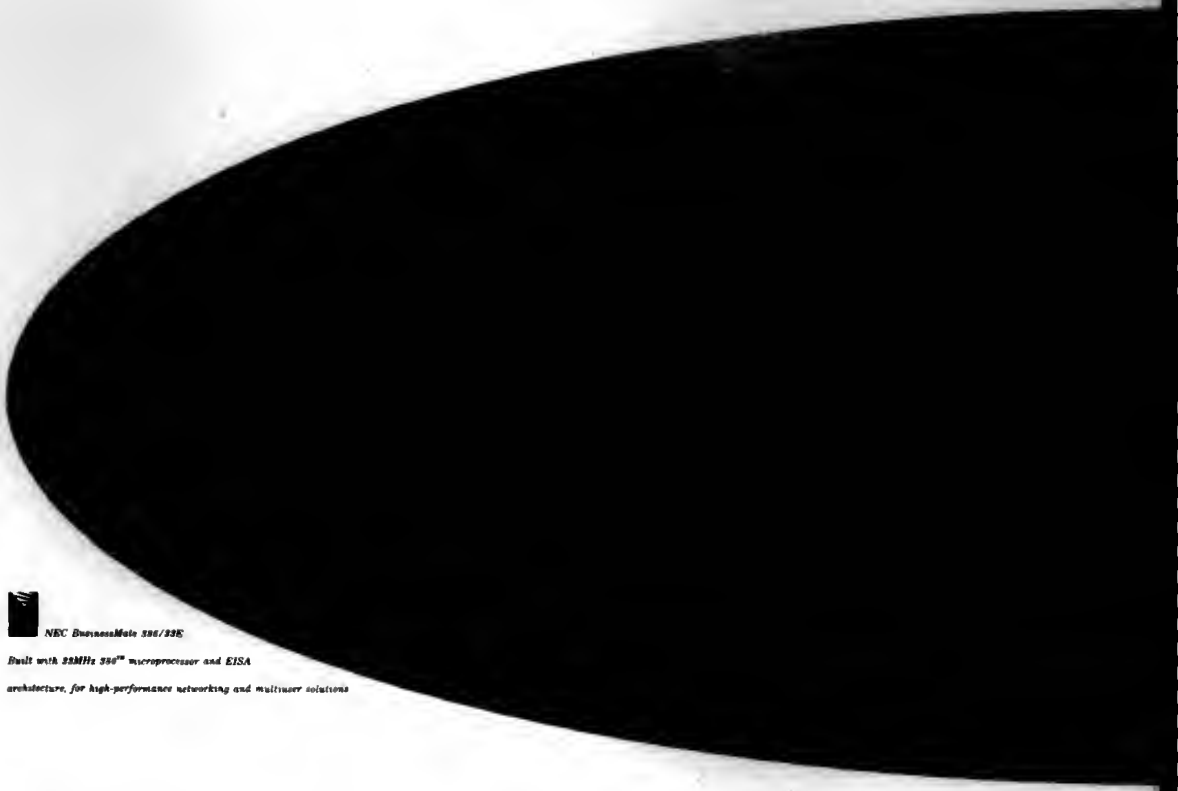

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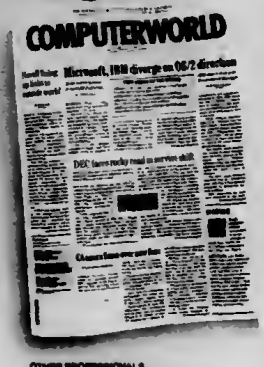

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Indiana team sets pace for game preparation

ON SITE

BY MICHAEL FITZGERALD
CW STAFF

INDIANAPOLIS — The Indiana Pacers think they have figured out a way to stop Michael Jordan and the Chicago Bulls, thanks to their computer network.

"Michael Jordan hasn't won a game in here since we've gone to computers," said Mike Mullen, computer analyst for the Pacers. The streak ended at six, though, shortly after Mullen made that statement, when the Bulls beat Indiana here at Market Square Arena. Still, using computerized play selection and analysis has improved the Pacers' overall performance, Mullen said.

The Pacers use their computer system to analyze what the Bulls or any other National Basketball Association (NBA) team will do in certain situations with particular players on the floor. While Mullen calls the Pacers' 6-1 record against the Bulls an "interesting side note," the Pacers think technology is more than an item of interest.

The team committed to a completely computerized operation three years ago, and today it has a 25-node network of NEC Corp. machines with an Advanced Logic Research, Inc. file server.

Its plan now is to bring technology to the bench by outfitting the team's coaches with Poqet Computer Corp. Poqets. The Pacers have two Poqets: one used by the team president, Donnie Walsh, to help him plan deals when he is on the road; the other is used by George Irvine, assistant coach and director of basketball operations.

The Pacers picked the Poqet primarily because of its proportions. The team considered notebook-size machines but found them too large for coaches to take on the road, when added to a full briefcase, suitcase and garment bags.

Notebooks "just are not suitable for the NBA," Mullen said. The Pacers waited, he said, for someone to invent a pocket-size computer. The Poqet seemed tailor-made, and the team plans to add two more before next season.

The Pacers have expanded their use of the Poqet. Last year, they drafted players based on information in a home-built database written in Alpha Software Corp.'s Alpha III, which is compatible with Ashton-Tate Corp.'s Dbase. This year, coaches input information into Bellevue, Wash.-based Buttonware, Inc.'s PC File, a file manager with relational reporting abilities. Mullen then loads the files into Dbase IV. This year, their draft pick will be made based on the same program running on the network.

The Pacers' official responsible for drafting in New York will have the Poqet on hand, as well as reference to the whole database on the local-area network. The game-planning system uses the same basic approach.

Past results

The Pacers hope the computer generates the same kind of discovery they made at last year's draft.

With its first pick buried deep in the second round of the draft (typically, only first-round picks make a team), the Pacers last year selected Kenny Williams, who had attended a junior college and had not played basketball in a year. The pick drew groans in Indiana and laughs around the rest of the league, but Williams made the team and scored well in this season's slam-dunk contest at the NBA All-Star game.

The NBA's Indiana Pacers *are using Poqet Computer Corp. machines for game preparation*

Mullen's current goal is to continue developing play analysis programs that the coaches can use during game time next season. The team may also decide to have Mullen sit on the bench during games.

"The biggest stumbling block is the end user, but once they get used to it and aren't scared of it anymore, they'll be using it," Mullen predicted.

Despite the relational databases and pregame computer analysis, the basketball coaching staff still has to make the decisions, especially since the computer occasionally generates suspect statistics. "I keep popping up that Mike Mullen is the best shooter in the league, but they won't believe me," Mullen quipped.

Attracting the fans

The Indiana Pacers play in one of the NBA's smallest markets, so the marketing department has turned to the team's LAN to draw more fans.

Mark Andrew Zwartynski, director of ticket sales and game operations for the Pacers, said the team has been using the network extensively to develop sophisticated approaches to linking its various databases of research drawn from season ticket sales, focus groups and other sources. The team's intention is to target its customers more closely.

Zwartynski said it is too early to tell what kind of impact these new methods will have on attendance, which dropped this season. He did say, however, that last year "we broke all attendance records for the 25-year history of the franchise. This current marketing staff has had the most sellouts in any given year, most sellouts in any number of consecutive years and highest average attendance in our history."

IMRS, Lotus update tool

BY MAURA J. HARRINGTON
CW STAFF

IMRS, Inc., based in Stamford, Conn., and Lotus Development Corp., based in Cambridge, Mass., recently introduced Executive Forum, a groupware software application specifically made for local-area network users running Lotus Notes under IMRS' Ontrack Executive Information System (EIS).

Executive Forum allows groupware users within IMRS' EIS system to hold an electronic mail conference using Lotus Notes. It also enables an executive to, for example, direct one note or memo to multiple users and attach it to any application residing under EIS, according to the vendors.

"This product is made for executives looking for the 'why' behind the answers in EIS reports — what we call the soft facts," said Gordon Rapkin, IMRS' vice president of product development.

Added compatibility

Another feature that is provided in Executive Forum is the ability to reply to or add to any application that resides under EIS or Lotus Notes, according to Rapkin.

IMRS developed its own graphical interface for the product, based on Microsoft Corp.'s Windows Version 3.0.

Executive Forum is expected to ship in volume this June. Pricing for a 10-user license is set at $25,000, the company said.

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SPF/2 takes advantage of OS/2's powerful features. It uses virtual memory to handle very large files. HPFS (High Performance File System) long file names are supported. And SPF/2 uses OS/2's REXX for its macro language—75 mainframe-compatible ISREDIT edit sub-commands provide the interface.

SPF/2's 3270 compatibility also contributes to your ease-of-use on the PC. SPF/2 processes keystrokes in the same way as the OS/2 Extended Edition 3270 emulator, including NEW-LINE and ENTER. SPF/2 even displays the same status indicators.

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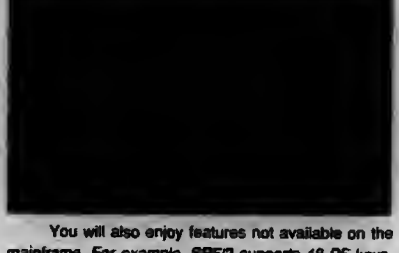

You will also enjoy features not available on the mainframe. For example, SPF/2 supports 48 PF keys, automatically adapts to the various OS/2 video modes (full-screen or windowed), and scrolls the file as you move the cursor. And, you will appreciate OS/2's virtually instantaneous response time.

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Micrografx copilots OS/2 2.0

BY PATRICIA KEEFE
CW STAFF

RICHARDSON, Texas — If OS/2 ever catches the user wave, Micrografx, Inc. plans to be along for the ride.

The graphics software developer is one of the most visible Windows proponents, and, when not working with Microsoft Corp., has occasionally proved to be one of its sharper critics. Two weeks ago, the savvy Texans leapt aboard OS/2 with both feet, clinching an extensive and influential joint development pact with IBM.

Micrografx has not only pledged to port its successful line of applications to OS/2 2.0 but will also lend its expertise to fixing and extending OS/2.

For starters, Micrografx will rewrite Presentation Manager's graphical engine to be 32 bit, portable and faster, said Lee Reiswig, IBM's assistant general manager of programming and personal systems.

"Presentation Manager's engine today is a mix of 16-bit assembler and C code. Micrografx will convert all that to C and make it 32 bit," Reiswig explained. Micrografx will also improve the algorithm, boosting performance 30% to 40% faster than the 16-bit engine.

IBM also plans to use an advanced version of Micrografx's Advanced Mirrors migration software, renamed the High Performance Windows Porting Layer (HPWPL), to assist developers in porting Windows software to OS/2.

"I don't know why they need a porting layer if OS/2 [2.0] will run Windows applications," said Steve Ballmer, Microsoft's executive vice president of system software. "If IBM figures out how to run Windows applications natively under OS.2, you won't need to port," he said.

Micrografx Chairman Paul Grayson said that while Microsoft's Windows Libraries for OS/2 lack 32-bit support, Advanced Mirrors, or HPWPL, has it. This means Windows applications will be able to run faster under OS/2, he said.

IBM also gets a Presentation Manager device driver kit, complete development of a Windows device driver porting layer and three drivers said to enhance OS/2 support for color output devices.

Micrografx, Inc./IBM agreement

- **Rewrite OS/2 Presentation Manager graphics engine.**
- **High performance Windows porting layer.**
- **OS/2 Device Driver Toolkit.**
- **Device drivers.**
- **Data-driven graphics application bundled with OS/2.**

Keefe

CONTINUED FROM PAGE 41

Chairman John Akers and President Jack Kuehler were concerned enough to drag themselves away from other things to address OS/2 concerns. Akers presided over a dinner with IBM's top 250 accounts. Kuehler attended the forums in celluloid spirit, if not in the flesh. Consider that they did not show up for last fall's Enterprise System/9000 introduction, which IBM termed "the most significant announcement in 25 years."

Kuehler's videotaped presentation pressed the point that IBM's determination to succeed with OS/2 doesn't need help from anyone else — i.e., Microsoft.

This was not the only volley directed at Microsoft. In a demonstration that provided concrete examples, Lee Reiswig, IBM's assistant general manager of programming and personal systems, positioned OS/2 as a "better DOS than DOS," a "better Windows than Windows," and even a "better OS/2."

He also stressed product quality, which IBM says it began to correct with the release of OS/2 1.3. In an interview, Reiswig said IBM "had" to bring out Version 1.3, which he appears to view as the first quality release of OS/2, and said that doing so delayed the release of OS/2 2.0 by a year. He claimed that Microsoft's position was to skip 1.3 and go right to 2.0.

OS/2's long-term survival and viability will be measured by IBM's success in a number of areas including the following:

- Whether Version 2.0 ships in 1991. This is no time to encounter the supply constraints plaguing a good portion of IBM's desktop computer deliveries.
- Whether Version 2.0 works properly out of the chute. This late in the game, it is unlikely that 2.0 could recover from a bug whiplash similar to that which hit the initial ship of Windows 3.0.
- Whether Version 2.0's promise of an integrated environmental shell that will run DOS, Windows and OS/2 programs succeeds in winning over both the client in general and the bulk of a skeptical Fortune 1,000 in particular. IBM will have to convince users that 2.0 can and should compete with Windows for the desktop.
- Whether IBM can pump up the volume of OS/2-specific applications. In the briefing, IBM talked about having 2,500 applications to run under OS/2 Version 2.0 but conceded that only about 300 are Presentation Manager-specific.

Keefe is Computerworld's senior editor, PCs and workstations.

dFacts Are In.

DATABASE COMPARISON TABLE	dBASE IV version 1.1	Paradox version 3.5	FoxPro version 1.02
EASE OF USE			
Control Center organizes data, queries, forms, reports, labels, applications on one screen	Yes	No	No
Create applications without programming	Yes	Yes	No
Modern pulldown menus for all Design Tools	Yes	No	Limited
Query by Example (QBE) for easy access to information	Yes	Yes	No
Context specific help by menu item	Yes	No	No
PRODUCTIVITY			
Quick Layout for automatic forms, reports and labels	Yes	No	Yes
Application Generator for quick application development	Yes	Yes	No
Automatic code generation for all Design Tools	Yes	No	No
Automatic maintenance of multiple indexes for ordering data	Yes	No	No
Memo fields for notes, letters, descriptions	Yes	No	Yes
POWER & FLEXIBILITY			
Bold, underline, italic, subscript, superscript text for high impact reports and labels	Yes	No	No
User Defined Functions for extending programming language	Yes	No	Yes
Data input validity checking in forms	Yes	Yes	Yes
Multi-user transaction processing ensures data integrity	Yes	No	No
Number of file formats imported/exported	7	6	3
INDUSTRY STANDARDS			
#1 Selling, #1 Rated multiuser database: over 3 million users (1)(2)	Yes	No	No
Compatible with dBASE III PLUS data and applications	Yes	No	Yes
Compatible versions for DOS, VAX VMS, Macintosh, SunOS and other UNIX platforms (3)	Yes	No	Limited
Structured Query Language (SQL) integrated with programming language	Yes	No	No

(1) dBASE III PLUS and dBASE IV comprise approximately 77% of PC database systems sold (3 times nearest competitor) according to the most recent reports by the market research firms Ander & Surveys (Oct. 1990) (2) Software Digest rated dBASE IV #1 among multiuser databases, October 1990 (3) Versions of dBASE IV are shipping for DOS, VAX, and SunOS. Macintosh and other UNIX platforms are committed.

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Sharp, Panasonic show portables

BY MICHAEL FITZGERALD
CW STAFF

NEW YORK — Sharp Electronics Corp. and Panasonic Communications and Systems Co. headed a list of companies that introduced new portable computers at the recent Laptop & Palmtop Expo '91.

Panasonic brought out the CF-370H6 Business Partner, a notebook computer based on Intel Corp.'s 20-MHz 80386SX chip. The 6.8-pound CF-370H6 features a 60M-byte hard drive, a 7½-in. IBM Video Graphics Array-compatible display, 1M byte of random-access memory, expandable to 5M bytes, and a suspend/resume function.

It will be available toward the end of next month and will retail for $4,799. Panasonic also made it possible to put a 60M-byte hard drive in its CF-270H6 Intel 80286-based notebook.

Sharp introduced new versions of its Wizard electronic organizers. The Wizard Signature series has a top memory of 128K bytes, double the 64K bytes available previously.

The machines also currently have Qwerty-style Chiclet keyboards and offer a larger, sharper display as well as software improvements, including on-line Help.

Graphic

CONTINUED FROM PAGE 41

the course, which met once per week for four hours.

An economist and computer scientist by training, Gottaman said he realized he had no understanding of color or composition. This was a problem for someone working in Cstar's six-person Human Systems Integration Lab, which is trying to figure out the best "packaging" for multimedia databases.

The result? "There were daily humiliations . . . but I've made a good beginning," Gottsman said. "I no longer find it foreign or irrelevant to the work I do." Specifically, he said, the class gave him an appreciation for the communication and miscommunication that can occur with a visual media.

Gottsman's work at the moment is a prototype multimedia teaching tool for Andersen Consulting systems integration analysts.

Dubbed Vader for video assisted delivery of experience and reasoning, it includes text about different subjects relevant to systems integration, and also features several video personalities, whom the user can "wake up" to narrate stories, and anecdotes that teach different business concepts.

"[Designing] a 3270-type interface, there's only so much damage you can do," Gottsman said. What is more, the customer base is changing and is coming to expect more attractive and graphically entertaining screens.

On his desk, Gottsman has an Apple Computer, Inc. Macintosh IICX with a two-page Radius, Inc. color monitor.

However, sending people to art school is "too cookbook," said Richard Crandall, president and chief executive officer of Comshare, Inc., an executive information system (EIS) software developer in Ann Arbor, Mich. He acknowledged he has not even found a good way to interview for art aptitude, let alone instill it in his programmers.

"You just have to take people who you suspect can do [GUIs] well and *mix them* in with a group that does this well . . . It's a very slow process," Crandall said. Over time, he added, the company has developed a style guide for its development staff describing what works and what does not work in GUIs.

COMSHARE'S APPROACH TO creating its highly graphical user interfaces begins by identifying the populations that will implement them.

The human element

Comshare's approach to creating its highly graphical user interfaces begins by identifying the populations that will implement them. The human interface requirements are different for computer-illiterate executives than they are for more computer-savvy managers, according to Crandall.

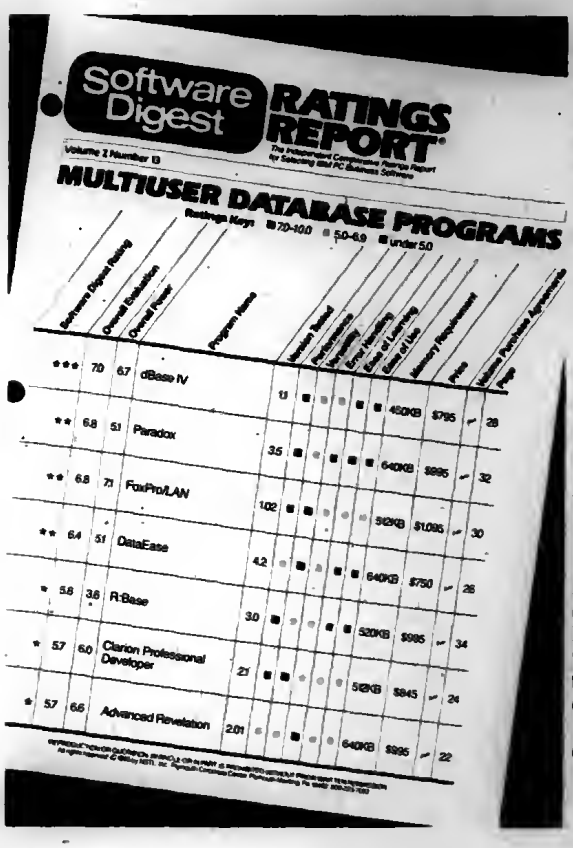
The effect of the art class can be seen in at least one of Gottsman's recent icons, a yellow Post-it-type note. When the user decides to "tear up" the note, a jagged black line is sent through the icon.

According to Gottsman, the aesthetic demands of user interfaces are expected to increase dramatically by 1996, "when simulation technology is available on the desktop."

However, Gottsman acknowledged he is unsure what the future multimedia, highly graphical user interface will look like. By way of analogy, he pointed to mistakes made during the dawn of television. "Some saw TV as radio with pictures," he explained.

One unsuccessful show, he said, simply gave its audience a picture of the traffic on the street in front of its building while playing its usual musical selections.

dTruth Comes Out.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*** 70 67 dBase IV 1.1 450KB $795 28
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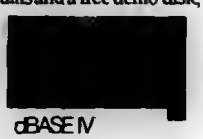
* 58 38 R:Base 3.0 520KB $995 34
* 57 60 Clarion Professional Developer 2.1 512KB $845 24
* 57 66 Advanced Revelation 2.01 640KB $995 22

Perhaps the most independent publication in the industry, *Software Digest* accepts no advertising whatsoever. Corporations pay hundreds of dollars a year to receive their monthly reviews—which are considered highly unbiased and objective. Their exhaustive, 75-page report concludes:

"Among the top ranking programs, dBASE IV (version 1.1) is the most well-rounded, with solid performance, versatility, and usability." Commenting on speed, *Software Digest* points out that "dBASE IV produces all three test reports as fast as or faster than FoxPro/LAN." As for Ease of Use and Ease of Learning, dBASE IV scored in the Excellent Range as many times as any other multiuser database product tested.

For a free evaluation kit, including competitive details and a free demo disk, call toll-free: 1-800-437-4329 ext. 1416. Better yet, call 1-800-2ASHTON to upgrade to the new dBASE IV now.



The truth is, no other database can do so much to improve productivity.

Ashton-Tate

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Optical discs move into reach

ANALYSIS

BY MAURA J. HARRINGTON
CW STAFF

End users are finally beginning to embrace optical disc technology, but it will be a while before they will be able to take full advantage of everything this technology has to offer at an affordable price.

Analysts concurred that while optical disc hardware prices have dropped significantly in the past year, compact disc/read-only memory (CD-ROM) and write-once read-many (WORM) drives are still too expensive for end users to easily justify the investment, partly because standards are still lacking for cross-platform optical disc technology.

"It will be 1995 before there is a mass acceptance of optical disc technology," said Bob Abraham, vice president of Freeman Associates, a market research firm based in Santa Barbara, Calif.

Nevertheless, optical disc technology is moving closer toward the average computer user's desktop.

CD-ROM usage is expected to balloon next year, according to a recent Datapro Research Group survey of federal government and military users. Of 900 respondents polled recently, only 26% said they are now using CD-ROM products. But that number will increase to 82% during the next year, the poll found.

The retail price of CD-ROM drives has dropped significantly in one year, from about $1,000 in 1990 to as low as $400 this year, with even more price drops expected in 1992, analysts said.

Prices for 5¼-in. WORM drives have come down from the $5,000 price range in 1988 to an expected end-user price range of $2,500 to $3,000 for a WORM drive introduced last month by JVC Ltd.

CD-ROM clincher

The decrease in hardware prices and the significant increase in mainstream software applications being delivered on CD-ROM were two of the factors that clinched Whirlpool Co.'s decision to move all of its product manuals from microfiche to CD-ROM, the Benton Harbor, Mich.-based company said.

By putting those documents on CD-ROM, using Microsoft Corp.'s Windows 3.0 as the front-end interface, Whirlpool increased the speed of its customer help service, knocking down the average time spent per call from approximately six minutes to about 4½ minutes, according to Bruce Dacre, Whirlpool's director of project management for the Consumer Affairs Group.

Officials at the U.S. Department of Commerce's Patent and Trademark Office said the agency improved its service relations by making all of its patent and trade records available to the public on CD-ROM.

Both Whirlpool and the Patent and Trade Office developed their own CD-ROM titles using WORM mastering systems that cost in the tens of thousands of dollars, a price far too expensive for many IS shops.

Price is not the only problem facing IS managers looking to publish their own CD-ROM titles or install CD-ROM drives in their IS shops. There is still no way to interchange CD-ROMs across multiple platforms.

For example, a CD-ROM disc running on a Unix machine cannot be read by a DOS-based machine. A standard, multiplatform file format system must be incorporated. While there is no solution to date, there are several vendor consortia working on standards that address various layers of the incompatibility problem.

So far, most of the current efforts to develop a standard file format system for optical discs revolve around the International Organization for Standardization's (ISO) standard.

The ISO 9660 standard specifies the media and basic drive characteristics for CD-ROM. The specifications were first developed by Sony Corp. and Philips Telecommunications N.V. Because the ISO 9660 standard is a physical standard, efforts are now focused on defining a set volume capacity and file format structure for all types of optical discs — including CD-ROM, CD-Write Once and magnetic optical discs.

One effort is being undertaken by the Rock Ridge Group, an ad hoc committee led by Young Minds, Inc., a CD-ROM publishing company based in Redlands, Calif. The group proposed two protocols to the ISO as enhancements to the present CD-ROM standard. The protocols were designed to allow Unix workstations to read DOS-based CD-ROM discs.

Another advisory committee, called the Frankfurt Group, is working on a volume and file structure standard for recordable CD-ROM discs, also known as CD Write-Once discs.

While these standards proposals demonstrate the advancement in optical disc technology, the time factor cannot be ignored. Even if these proposals were to become de facto standards, as the organizations hope, they could not be incorporated into the ISO 9660 standard until it is up for review by the ISO in 1993.

Gaining bit by bit

CD-ROM technology is winning acceptance, although slowly

- Analysts say they still believe that it will be 1995 before compact disc technology is widely accepted by corporate users, with the lack of standards being one barrier
- Base prices for CD-ROM drives have dropped precipitously in one year, from $1,000 to $400
- Lower prices and the availability of more applications have already led to increases in corporate use of CD-ROM

CW Chart: Doreen St. John

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CW0491

Sun users hot on CD-ROM trail

Despite the fact that Sun Microsystems, Inc.'s workstation and networking users are being forced into investing in CD-ROM technology by the end of this year, the enthusiasm for CD-ROM technology among Sun users appears to be mounting.

While Hewlett-Packard Co., Digital Equipment Corp. and Sun have all begun offering their systems software on CD-ROM, reasoning that it is more convenient for the end user as well as being cheaper than tape, it is Sun that has led the pack in its efforts to integrate CD-ROM into the workstation industry.

"By offering our system software solely on CD-ROM, we are able to save money, and that savings can be passed on to the end user," said Jamie Rapperport, Sun's distribution program manager. Rapperport admitted that in the past, users have been reluctant to adopt CD-ROM technology into their systems. However, he asserted that the company's decision to offer its systems software only on CD-ROM was in response to user demands. Although none of the users interviewed for this article said they asked Sun to transfer its systems software from tape to CD-ROM, many agreed that the new medium has its benefits.

Sun user Bob Shuttles, local-area network administrator at the Los Alamos National Laboratory in Los Alamos, N.M., said he has installed CD-ROM drives in the laboratory's network servers, and he likes the benefits the technology has brought him so far.

"Having our system software installed on CD-ROM over the network works out very nicely. It cuts the installation time by about two thirds compared to that of tape," Shuttles said.

"I think CD-ROM is great; we have drives installed here and we use it. The only thing is, the technology is still a little too expensive for everyone to have their own drive right now," said Sun user Michael Cutter, a member of the technical staff at AT&T Bell Laboratories in Whippany, N.J.

MAURA J. HARRINGTON

Due to a lack of photographic contrast, this page did not reproduce well.

Dataease 4.24: Power with lots of structure

Dataease International, Inc.'s Dataease Version 4.24

Reviewer	Ease of use	Data integrity	Multiuser support	Performance	Applications development	Documentation	Service & support	Value	Score
Infoworld 1/14/91	Very good	Good	Good	Satisfactory	Satisfactory	Good	Excellent	Good	Powerful, Limited programming
LAN Times 6/90	Very easy to use	Ensures accuracy	Several good features	NC	Powerful and flexible	Complete	NC	NC	Easy but powerful
PC World 5/91	Good	NC	Excellent	Fair	Fair	NC	NC	Good	Friendly, lacks debugger
Users									
Bill Skelding, Mobil Oil Corp.	■	■	■	■	■	NC	■▄	■	Just what we want in a DBMS
Martin Fox, Manufacturers Hanover Trust Co.	■	■	▄	■	■	▄	▄	■	Best product for the price
Drew Hannah, Connecticut Mutual Life Insurance Co.	▄	▄	▀	▄	▄	▀	■	■	Power and ease but not flexible
Analysts									
Karen Offermann, Datapro Research	■	▄	▄	▄	▀	▄	■	▄	Intuitive and powerful
Jerry Caron, Faulkner Microcomputer Reports	▄	■	■	■	▄	▄	▄	■	Outstanding package
Ty Fielding, Spantech Software, Inc.	■	■	■	■	■	■	■	■	Best positioned

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment Key: ■ Very good ▄ Good ▀ Fair ▪ Poor

Technology Analysis — A roundup of expert opinions about new products. Summary written by free-lance writer Suzanne Weixel.

Dataease International, Inc.'s Dataease Version 4.24 would not be a likely choice for experienced programmers building complex applications, but the power and simplicity of its nonprocedural approach to relational database management earned high praise from reviewers.

Ease of use: Menu-driven and intuitive, Dataease provides powerful processing capabilities without a need for programming. But getting around the limitations of the package's structured approach requires creativity and know-how, reviewers said. For example, to delete more than one record at a time, users must write a separate query. Applications development and data entry can be accomplished through lists or menus. The forms facility lets users create forms with one-to-many relationships, and forms can double as report definitions. Dataease features forms-based query-by-example entries to generate multitable queries. Users can further customize queries with the Dataease query language (DQL). But all query results must be formatted as report output, according to *Infoworld*.

Data integrity: Dataease's built-in automatic file and record locking help ensure data security. In addition, users can customize security features for each database. The package includes seven predefined security levels and hard-coded lists of fields for each user. Locks can be shared or exclusive, and when a user tries to access a locked resource, a message identifying who placed the lock is displayed. Data validation is specified as part of the field definition. Referential integrity is enforced via the form mode.

Multiuser support: Dataease offers a solid multiuser environment, although some basic functions must once again be arrived at by working around the product's limitations, reviewers said. For instance, there is no direct support of network print spoolers, *Infoworld* said.

Performance: Certain functions slow Dataease's processing. For instance, transaction processing is fast, but query response time can be sluggish. Also, performance falls off in a multiuser environment. Dataease requires 640K bytes of random-access memory and uses extended memory.

Applications development: Despite its nonprocedural approach, Dataease includes some variables and control structures that allow procedural processing, but refining and polishing applications within the constraints imposed by DQL may require programming experience.

Infoworld reported that users cannot use macros or variables for file indentifiers within a DQL procedure and that outside files cannot be accessed without importing.

Documentation: The manuals provided with Dataease are well-written and useful. There is a thorough table of contents and a comprehensive index. On-line Help is available but is somewhat meager. According to *LAN Times*, the Help keys are nonstandard and therefore somewhat awkward to use.

Service and support: Unlimited free (but not toll-free) support is available, as well as extended plans support for companies. Technicians who responded to telephone inquiries took the initiative in trying to solve problems and answer questions, reviewers said.

Value: If users are looking for a database management system product that everyone can use, Dataease is it, reviewers reported. It is powerful and provides quick and easy productivity benefits without programming. The trade-off for these features is a lack of flexibility, but even that can be overcome by a creative developer. Dataease costs $750 for a single user; each additional three-user local-area network pack costs $750; a five-user LAN pack costs $995.

"ALTHOUGH DATAEASE is more structured than other DBMSs, it is faster to get an application up and running. If you are creative, you can accomplish anything."

Martin Fox
Technical Officer
Manufacturers Hanover Trust Co.

Vendor financial information

According to Dataease International, Inc., Dataease's installed base is approximately 440,000 copies. The base is currently growing at a rate of between 20% and 25% per year. Sales growth for the product is in the same range. The company's overall profitability is higher than 25%. A private company, Dataease does not release specific financial data.

Dataease responds

Comments from Fred Holahan, vice president of product development:

Performance: Different database engines tend to perform better at different sets of activities. We try to optimize our performance according to the needs expressed by our user community. There will always be some more satisfied than others.

Applications development: DQL is as robust a programming environment as you will find. It is meant to be used in conjunction with our system utilities, and the combination results in an extremely powerful programming environment. In the future, we plan to make it possible to access outside third-generation languages to make use of their capabilities. In the meantime, DQL's syntax checking capability minimizes the need for a debugger. DQL's editor is perfectly fine, but some people want to use their own. There are third-party add-on utilities available to let users use other editors.

Documentation: We have not received complaints about our on-line Help.

NEXT WEEK

▶ Hewlett-Packard Co.'s Laserjet IIP and IBM's Laserprinter E receive high marks from reviewers for their price/performance features.

NEW PRODUCTS

Peripherals

Nissei Sangyo America Ltd. has announced a 20-in. color monitor designed for computer-aided design and manufacturing applications.

The CM2087M ($3,595) includes a dual-function microprocessor that supports multiscanning resolutions of 1,280 by 1,024 pixels. The monitor also features a 120-Hz vertical scan rate.

Nissei Sangyo America
800 South St.
Waltham, Mass. 02154
(617) 893-5700

Extended Systems, Inc. has introduced a printer-sharing device that includes four input ports that support serial and parallel connections as well as a serial and parallel port.

The ESI-2249A Multispool ($695) features Extendedlink technology, which enables users to transfer data at a rate of 23K byte/sec. via a parallel connection up to 500 feet away.

Extendedlink parallel port adapters cost $60 each; serial port adapters are priced at $20 each.

Extended Systems
6123 N. Meeker Ave.
Boise, Idaho 83704
(208) 322-7575

NEC Technologies, Inc. has announced a color thermal printer equipped with an Adobe Systems, Inc. Postscript page description language controller.

The PS Model 40 ($6,995) features 4M bytes of random-access memory and 17 Adobe typefaces. The product can produce letter- and A4-size pages.

An upgrade kit for the Model 40 includes one daughterboard with 4M bytes of RAM and one with 18 additional Adobe fonts. The upgrade kit costs $2,000.

NEC
1414 Massachusetts Ave.
Boxboro, Mass. 01719
(508) 264-8000

Development tools

Building Block Software, Inc. has announced a new edition of its CAD/CAM Developers Kit.

Edition 2D is a library of C language functions for two-dimensional geometric computations and displays and Data Exchange Format file transfers. Operations performed include rotation, scaling, mirroring and trimming of basic geometric shapes. The product supports compilers from a number of companies and is compatible with Autodesk, Inc.'s Autocad Development System and Microsoft Corp.'s Windows 3.0.

The personal edition, licensed for in-house use only, costs $499. Royalty-free distribution rights cost an additional $500.

Building Block Software
77 Pearson Road
Somerville, Mass. 02144
(617) 628-5217

Watcom Products, Inc. has announced the C/P16 Compacting and Optimizing Compiler for reducing code size.

The compiler generates compacted P/16 code for infrequently used regions of an application; at execution time, a P/16 interpreter is invoked. Frequently used application sections are compiled into optimized native Intel Corp. 80286, 80386 or I486 code. According to the company, this method reduces program size by up to 40% without a significant cost in execution speed.

The C/P16 costs $5,000. There are no royalty fees for compiled applications.

Watcom Products
415 Phillip St.
Waterloo, Ontario N2L3X2
(519) 886-3700

Software Quality Tools Corp. has upgraded the testing module of its Software Quality Management System (SQMS).

SQMS/Testing Version 1.2 allows developers to predict software reliability and fault detection costs through problem tracking and code change capture systems. SQMS comprises five modules, including design testing and development cost estimating programs, plus a user environment. The product is SQL-compliant and is available on Sun Microsystems, Inc.'s Scalable Processor Architecture platform.

The SQMS package costs $15,000 for the stand-alone version or $25,000 for a server license.

Software Quality Tools
Suite 200
2000 West Park Drive
Westboro, Mass. 01581
(508) 366-5045

Software utilities

Rosesoft Co. has begun shipping Prokey Plus Release 5.1, a keyboard macro processing package that includes an event scheduler to enable an IBM Personal Computer XT, AT or compatible to perform various tasks without user intervention.

Features include user-specified variable looping and flexible date and time formats.

The product costs $129.

Rosesoft
P.O. Box 70337
Bellevue, Wash. 98007
(206) 562-0225

The IBM RISC System/ The power you've been seeking

It's a never-ending quest for power seekers. You're always looking for ways to run your favorite applications faster. Well, search no more. The RISC System/6000™ family of POWERstations and POWERservers gives you power that soars as high as 23 MFLOPS.

	MFLOPS	MIPS	SPECmark™
POWERstation 320	8.5	29.5	24.6
DECstation 5000-200	3.7	24.2	18.5

When it comes to porting, your ship has come in. Of course, all the speed in the world wouldn't mean much without the applications you need. So the RISC System/6000 family already has more than 2,500 of the most popular technical and commercial applications up, running and running fast. And if you think you know a good thing when you see it, so do software vendors. That's why you'll also be seeing more and more applications coming on board the RISC System/6000 platform all the time. And if you like to build your own solutions, there's a full arsenal of enablers and relational data bases from leading vendors, as well as CASE tools and a host of popular programming languages.

A smorgasbord of solutions. Applications already announced include the IBM engineering design packages CADAM,™ CAEDS,™ CBDS,™

MFLOPS are the results of the double-precision, all FORTRAN Linpack test 100x100 array suite. The Dhrystone Version 11 test results are used to compute RISC System/6000 integer MIPS value where 1,757 Dhrystones/second = 1 MIPS (Nov 11/789). SPECmark is a geometric mean of ten benchmark tests. All performance data are based on published benchmark information.

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Macintosh products

Mobius Technologies, Inc. has announced the Mobius 030 Display System, an integrated video system and accelerator board for upgrading Apple Computer, Inc.'s Macintosh SE.

The system is based on a 25-MHz Motorola, Inc. 68ECE030 processor. It also includes an on-board video controller and a one- or two-page monitor. The accelerator and video are integrated to use the Macintosh SE's single slot. Mobius reported that the system increases SE performance by up to six times.

The system costs $995 with the 78 dot/in. resolution one-page monitor; $1,195 with the 75 dot/in. two-page display. The company has also announced the same upgrade package for the Macintosh Classic. The 030 daughterboard clips directly onto the Classic's motherboard via a special connector. Pricing is the same as for the SE.

Mobius Technologies
5835 Doyle St.
Emeryville, Calif. 94608
(415) 645-0556

Hyperpress, a division of Medialab Technologies, Inc., has begun shipping Hyperbundle 2.0, an Apple Computer, Inc. Hypercard 2.0 development tool kit.

Hyperbundle includes a copy of Hypercard 2.0 plus tools for organizing development projects, creating advanced palettes, generating and storing scripts and editing icons.

The package costs $134.50.

Hyperpress
1166F Triton Drive
Foster City, Calif. 94404
(415) 345-4620

Systems

Aydin Controls, a division of Aydin Corp., has introduced a reduced instruction set computing-based workstation targeted for high-performance monitoring and control graphics applications.

The Model 7100, built around a Motorola, Inc. 88000 processor, includes a real-time kernel running AT&T Unix 5.3.2. It offers 1,280- by 1,024-pixel color display and Transmission Control Protocol/Internet Protocol support for Ethernet-based local-area networks.

The system starts at $35,100, including a tape drive and 90M-byte hard disk.

Aydin Controls
414 Commerce Drive
Fort Washington, Pa. 19034
(215) 542-7800

Leading Technology, Inc. has introduced a 6½-pound Intel Corp. 80386SX-based notebook computer for $2,999.

The 9800NB includes a standard 2M bytes of random-access memory (expandable to 8M bytes), a 3½-in. floppy drive and a 20M-byte hard drive. It has an IBM Video Graphics Array LCD display with 16 gray scales. Also included is one year of 48-hour response time service.

Leading Technology
10430 S.W. Fifth St.
Beaverton, Ore. 97005
(503) 646-3424

Board-level devices

Truevision, Inc. has begun shipments of a videographics display card for personal computers.

VideoVGA generates both a noninterlaced IBM Video Graphics Array (VGA) signal and an interlaced National Television Standards Committee video signal, allowing users to record animation files or overlay color VGA graphics onto a live video source. It includes drivers for all standard software, the firm said.

The product, with 512K bytes of memory, is priced at $995. A 1M-byte version costs $1,195.

Truevision
7340 Shadeland Station
Indianapolis, Ind. 46256
(317) 841-0332

Orchid Technology, Inc. has begun shipping Prodesigner II/MC, a Micro Channel Architecture-compatible graphics card supporting up to 1,024- by 768-pixel display in 256 colors on interlaced and noninterlaced monitors.

The card is IBM Video Graphics Array-compatible and includes a comprehensive array of software drivers, according to the company. A custom font designer, a speed program and several other software utilities come with the product.

Prodesigner II/MC ships with 1M byte of memory and costs $599.

Orchid Technology
45635 Northport Loop West
Fremont, Calif. 94538
(415) 683-0300

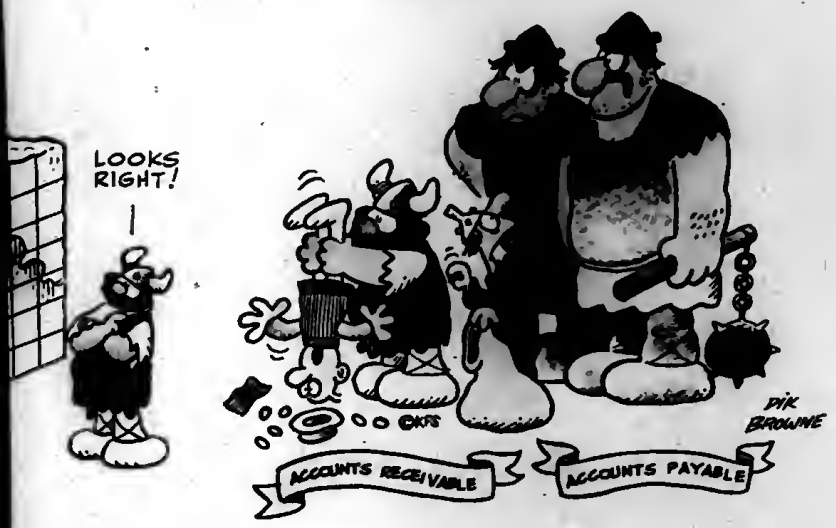
Kingston Technology Corp. has introduced high-capacity memory upgrades for IBM RISC System/6000 workstations.

The upgrades include eight 2M- or 4M-byte memory modules. The price for the 16M-byte board is $3,995; the 32M-byte board costs $8,995.

The company said it has also begun shipping memory upgrades for a number of leading notebook personal computers, including credit-card-size upgrades for Intel Corp. 80386SX-based portables from Compaq Computer Corp. and Toshiba America, Inc. Pricing for a 1M-byte upgrade begins at $160, depending on the type of computer.

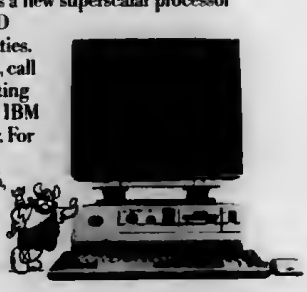
Kingston Technology
17600 Newhope St.
Fountain Valley, Calif. 92708
(714) 435-2600

6000 family.
for all your applications.



CATIA™ and AES. Also available are a broad spectrum of solutions from vendors like Valid Logic, MacNeal Schwendler, Swanson Analysis, SAS Institute, SPSS, Wavefront, Alias, Polygen, Cadence, Fluid Dynamics International, Western Atlas, ECL Petro and creare.X. Scientific and technical applications are available in areas like physics, structural analysis, chemistry, securities trading, mathematics, earth resources, operations research, visualization, graphics, technical publishing and more. There's also accounting software like FourGen and support for leading UNIX®-based office automation packages. And there are key industry applications for businesses in medical groups, retail stores, newspapers, pharmacies and many more.

Command enormous processing clout.
The RISC System/6000 family is built to boost the performance of the software power seekers use most. It's got the best floating point processor in the business for numerically intensive applications, plus a new superscalar processor and incredible 3D graphics capabilities. To find out more, call your IBM marketing representative or IBM Business Partner. For literature, call 1 800 IBM-6676, ext. 990.



For the Power Seeker.

IBM

HOW OTHERS SEE THE MACINTOSH-TO-MAINFRAME CONNECTION.

When it comes to system integration, you don't have to treat the Mac differently than any other device on your network. Introducing the MacMainFrame Series, the broadest range of Macintosh-to-mainframe connectivity options available.

MORE CHOICES. MORE SOLUTIONS.

Now, in an integrated set of solutions, local or remote Mac users in Token Ring, SDLC or coax environments can tap centralized information to make every Mac user's desktop more powerful.

MacMainFrame distributes terminal emulation, file transfer, printer emulation and mainframe graphics across a wide variety of networking schemes.

Since it's fully AppleTalk compatible, EtherTalk, TokenTalk and LocalTalk networks are part of the solution, too.

For customization, there's Avatar's Programmer's Toolkit, a full range of Applications Programming Interface (API) tools. For example, Avatar's Hypercard API has been used to develop a front end system to PROFS, IBM's electronic mail system.

THE MACMAINFRAME DIFFERENCE.

Unlike some Mac-to-mainframe connections, MacMainFrame enhances the benefits of the Macintosh user experience.

Since MacMainFrame is completely IBM 3270 compatible, it has no impact on normal mainframe operations. The result? An integrated working environment that increases productivity and reduces headaches.

HOW AVATAR SEES IT.

SOMETHING ELSE WE SEE. SERVICE.

With eight years of experience, Avatar offers something beyond products and technology. It's called responsiveness. You see, as the 3270 connectivity specialists, we have helped to integrate Macintosh computers and PC printers into many different environments. Which means we can do the same for you. With a single integrated set of solutions for Token Ring, SDLC, and coax, both standalone and via gateway.

To find out how, call this number toll free at

1-800-289-2526.

You'll find that we understand Macintosh-to-mainframe connectivity like no one else. So as your network options continue to grow, Avatar can help you see the forest through the trees.

Avatar

65 South Street, Hopkinton, MA 01748

DCW14

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COMMENTARY

Jeffrey N. Fritz

Don't count ISDN out

Let's face facts. ISDN technology has not exactly been a roaring success. We once heard predictions that by 1990 fully 1% of U.S. telephone lines would be ISDN-capable. Today's actual number is far less. Concern is now being expressed about ISDN's viability. Service providers, vendors and users are nervously saying, "ISDN is not moving. Something is wrong. Who is to blame for this lack of progress?"

The answer is that no one is to blame, nor is anything particularly wrong, other than a slower than expected deployment. What we are seeing is a period that Theodore Irmer, director of the Consultative Committee for International Telephony and Telegraphy (CCITT) and "father of ISDN," labels the "realistic reassessment" of ISDN deployment. The early predictions of ISDN deployment were overly optimistic, Irmer says. As he puts it, "It simply takes time for the user community to accept new technologies, particularly in data communications."

A look at ISDN converts seems to confirm Irmer's viewpoint. Steadily and without fanfare, more and more companies are signing up for ISDN services. AT&T is reported to be gaining an average of one new customer per day. This is a marked increase over its previous six customers per month. However, there is little argu-

Continued on page 64

Users laud Spectrum network manager

BY JOANIE M. WEXLER
CW STAFF

Seven months after Cabletron Systems, Inc.'s leap into the enterprise network management software fray with its artificial intelligence-based Spectrum announcement, nary a technical criticism has fallen from the tongues of beta-test users of the product, which became generally available earlier this month.

In fact, many beta users are now in purchase negotiations for the $50,000-and-up, Unix-based software, designed to centrally manage very large internetworks that comprise a hodgepodge of various vendors' equipment.

"Spectrum is the only product that does the trick for us because we have about a dozen diverse network management systems that we're trying to pull together onto one screen," explained Mike Turico, manager of applied research at Motorola, Inc. in Schaumburg, Ill. Turico said he has been beta-testing Spectrum for nearly one year on the 100,000-node Motorola network and has committed to purchasing at least one copy.

"My job is to make all those management systems one, and Spectrum is really the only way I can do it," Turico explained.

Development options

To date, Cabletron has developed software modules for managing about 40 diverse types of network equipment. Customers can work in tandem with Cabletron to develop modules for currently unsupported devices, develop it themselves or turn to a third party.

Beta-test user John K. Scoggin Jr., supervisor of network operations at Delmarva Power & Light Co. in Wilmington, Del., said Spectrum already "supports every major vendor" in his network, including equipment from Wellfleet Communications, Inc., Proteon, Inc., Cabletron and "soon, Banyan Systems, Inc. network servers."

Cabletron repositioned itself as a network management company when it formally introduced Spectrum at last fall's Interop '90 show in San Jose, Calif. Some considered the move a stretch for the Rochester, N.H.-based company, whose roots are in cabling, wiring hubs and network interface cards.

However, the concept of a centralized network manager that gives users a graphical view of a heterogeneous network from a variety of perspectives was appealing to at least 30-plus

Continued on page 58

Budget blitz

With the enterprise network management market still ripe, Spectrum's success could hinge on Cabletron Systems, Inc. quickly grabbing market share

Integrated network management budget plans over the next two years

Percent of respondents

Base: 500 Fortune 1000 firms

Source: Business Research Group
CW Chart: Doreen St. John

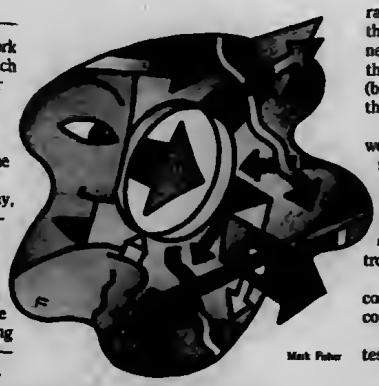
FEATURE: NETWORK ACCOUNTING

Choices aren't always black and white

BY LUCIE JUNEAU
SPECIAL TO CW

Weighing a variety of network accounting methods, Rich Belcastro, staff director for network development at McDonald's Corp., faces one overriding question: How simple or complex should the method he chooses be?

For many network managers today, that question looms large. Precise tracking and billing of network use is frequently still considered too costly and cumbersome. However, growing cost consciousness throughout information systems departments is leading some network managers to break down billing — or at least implement usage tracking — in hopes of improving network efficiency.



Mark Fisher

Network accounting practices can range from very simple (such as allowing the IS department to pick up the entire network tab or charging all expenses to the biggest network user) to very complex (billing departments or individual users on the basis of their precise use).

The latter option is hardly a snap. "If it were easy to do, we'd do it," says John Coman, manager of network information services at Atlantic Richfield Co.

"The goal is to keep it simple so the chargeback process in itself doesn't become a severe burden and cost," Belcastro says.

Despite the potential pitfalls, some companies are moving to build network accounting systems based on actual use.

"Our network billing system is in a testing process," says Kelsey Hill, Marri-

Continued on page 54

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Choices

CONTINUED FROM PAGE 53

ott Corp.'s vice president of systems and telecommunications at the firm's Information Systems and Technology Division. "We're still charging on a fixed-charge basis but trying to go to s usage basis."

When the new accounting system is implemented, Marriott will charge corporate groups for their business- or location-specific network expenses, in addition to levying charges based on use of such common network resources as the company's T1 backbone and switching equipment, Hill says.

Marriott's new billing system was developed in-house, according to Hill. "We've taken usage information available from the intelligence in the network [from BBN Communications Corp.] and built a customized cost accounting system that lets us use information for billing and for fine-tuning the network for trending and capacity planning," he says.

The company is considering charging back for use of the common network resources based on a charge per kilocharacter, or every 1,000 characters, Hill says. "This is consistent with what you would see in commercial, value-added [public] networks," he adds.

To get s handle on the network's cost-effectiveness, Hill says he would like to be able to determine the cost of transmitting a unit of information on Marriott's private network relative to the cost of transmitting the same unit over other private networks or commercial value-added networks from carriers such as U.S. Sprint Communications Co.

Like Marriott, many companies that are implementing chargeback procedures are putting together their own billing systems or turning to third-party software writers for customized systems. One reason is that there are virtually no off-the-shelf, generic billing systems available, analysts say.

"You can't build a billing product that would know how to work with the various vendor systems that are out there," and no single product could address a wide variety of customer billing needs, says Hub Vandervoort, president of Horizon Strategies, Inc., s consulting firm in Brookline, Mass. The billing systems on the market are almost exclusively vendor-specific and usually sold with the networks as value-added features, he says.

Most companies that have large wide-area networks use private lines leased from major carriers including AT&T, MCI Communications Corp. and Sprint, analysts say. The carriers are primarily in the business of providing raw bandwidth, but most also offer services for switching through their networks and methods of billing. Smaller telecommunications vendors, including Williams Telecommunications Group, Alcatel Network Systems and Rochester Telephone, also provide such services.

Joyce Rizvi

Avon's Perry: *'We're able to look at call abuse and to provide users with overall information about their level of use.'*

Sprint has seen s marked increase in the number of customers looking for chargeback solutions, says Jon Peacock, director of marketing for the Sprint International Network Systems Group. "They want to start backcharging individuals, divisions or departments. Right now, I would guess that about 30%, maybe 40% of customers we sell [private] networks to have some form of end-billing package," he says.

Prices for carriers' accounting/billing packages depend on the size of the network and the clients' billing and reporting needs, analysts say. "There really is no rule of thumb. The major carriers offer a lot of different pricing packages for using their services," says Steve Lake, principal consultant at Horizon Strategies.

After leasing a data or combined data/voice line from a telecommunications vendor, some organizations use equipment from multiplexer vendors to provide the tracking information they need to bill back charges, Lake says.

Most of the multiplexer vendors — including such companies as Newbridge Networks, Inc., Network Equipment Technologies, Inc., Racal-Milgo, Inc. and Stratacom, Inc. — offer monitoring capabilities through software in the node or through separate software running on s personal computer, workstation or some type of terminal interface, extracting data from the network so that it can then be manipulated for billing purposes, Lake says.

Many companies that charge back to multiple departments for use of the network don't track all of their network traffic continually. Avon Products, Inc. levies charges based on estimated network use, which is determined by monitoring the network periodically.

"We do charge back but don't do it on a strictly tracked basis," says Raymond Perry, vice president and chief information officer at Avon. Charges are based on an individual organization's share of total network use, which is estimated yearly, he says.

Feedback on call use

Avon's IS department periodically monitors use on the network, which runs on a T1 backbone, for capacity planning purposes and to derive its forecast estimates, Perry says. "We're able to look at call abuse and to provide users with overall information about their level of use," he says.

Still, the company doesn't feel that accounting for all the traffic on the network would be worthwhile, he says. "Because we're tracking and controlling costs and because we report back to our users their overall consumption, we don't think a breakdown on s call-by-call basis is worthwhile. It takes time and effort to create that," Perry says.

Many firms share Avon's skepticism about the value of tracking all network traffic, analysts say. "You reach a point of diminishing returns," says Edwin E. Mier, president of Mier Communications, a consulting firm in Princeton, N.J.

"Most people, after they take a look at the amount of work involved, fall back on pro rata [billing]," says Frank Dzubeck, president of Communications Network Architects, Inc., a consulting group in Washington, D.C.

One-stop shopping

Some organizations with extensive WANs are able to avoid complex network accounting solutions by charging back all of their network expenses to one corporate department.

One such company, New York Life Insurance Co., charges 100% of its network costs to its policyholders' services department, which accounts for about 98% of the traffic on the network.

New York Life uses services provided by its vendor carriers, AT&T and MCI, to monitor traffic on the network, says Tom Pettibone, senior vice president for information services. "When it looks like s line is getting overloaded, we put in another line," he says.

US Air, which has sophisticated network tracking capabilities, reports usage information to its departments to encourage them to conserve network resources but doesn't charge them. By monitoring network traffic, the company gains useful information for planning network expansion, says Paul Singer, manager of communications planning. Knowing precisely how the network is used makes it easier to order new circuits, he says.

US Air uses AT&T's Virtual Telecommunications Network Service (VTNS), an enhanced billing system, to track network use, Singer says. VTNS "can group [network] traffic pretty much any way you'd like it," he says. "We track bills by major departments, such as reservations. We can also track by network service: There's a bill for the data communications network and a separate bill for the voice network."

Juneau is a free-lance writer and editor based in Salem, Mass.

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—*Murphy's Law, v.1.3*

IBM program to link VM hosts with non-IBM systems

BY ELISABETH HORWITT
CW STAFF

IBM quietly announced last month a program for creating high-speed links between VM hosts and a wide variety of non-IBM systems.

The IBM VM Programmable Workstation Communications Services allows workstations running OS/2 Extended Edition, AIX-Personal System/2, MS-DOS and Microsoft Corp. Windows 3.0 workstations to access services on System/370, System/390 and 9370 VM servers. IBM told consultants that the program would support Apple Computer, Inc. Macintoshes, RISC System/6000-AIX workstations and Sun Microsystems, Inc. workstations in the future, according to Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C.

The program targets the needs of users who are doing engineering applications and program development on VM systems and want to distribute some of the tasks down to Unix workstations on Ethernet or Token Ring local-area networks, Dzubeck said. The program was designed to take up comparatively small amounts of main memory so as to ensure quicker response time, according to Norman Hager, IBM planner for VM.

A central feature of the program is IBM's Common Programming Interface for Communications (CPIC). The advantage is that applications written to the interface on one type of system can be ported to CPIC implementations on other systems. Thus, an application written to Programmable Workstation Communications Services will be portable across all workstations supported by the program.

However, the program does not have CPIC's other advertised advantage: the assurance of interoperability between applications on multivendor CPIC systems, over IBM's peer-to-peer LU6.2 protocol. Applications written to the workstation portion of the program can talk to VM systems only via a unique link developed just for the program, Hager said. The program does, however, allow LAN workstations to access resources and other workstations on an LU6.2 network via the VM server, he added.

IBM has implemented a Transmission Control Protocol/Internet Protocol (TCP/IP) connection between AIX workstations and OS/2 Extended Edition systems, Hager said. The OS/2 servers act as communications gateways between the LAN and the System/370 and System/390 hosts, he added. The 9370s have internal communications processors and do not need the OS/2 gateway.

IBM has provided TCP/IP support because the protocol is a networking standard for Unix systems, Dzubeck said.

Again, however, the program does not allow workstations to use TCP/IP as a general link to other systems but only as a link to OS/2 gateways, Hager said. Nor has IBM provided a true TCP/IP implementation for CPIC, which would allow applications to be ported from LU6.2 to TCP/IP, Hager said.

IBM is in the process of developing such a CPIC interface for the Open Systems Interconnect protocols. A group of vendors and users is now working on a standardized application programming interface for TCP/IP, he added.

BIT BLAST

Beam me up, Cal State

California State University is reportedly leveraging U.S. Sprint Communications Co.'s international Meeting Channel videoconferencing network to beam educational resources around the world. Initially, the new California State Video Network is expected to link campuses in Sacramento, Calif., and Bakersfield, Calif., and a Sprint Meeting Channel room on the Sacramento campus will connect the university with nearly 1,000 public and private facilities in the U.S. and overseas.

Now that Banyan Systems, Inc. has added OS/2 clients to its Virtual Networking System (Vines) local-area network, the firm has reportedly teamed up with Transmission Control Protocol/Internet Protocol (TCP/IP) vendor FTP Software, Inc. to jointly market FTP's TCP/IP software for OS/2 personal computers. TCP/IP is a set of de facto standard protocols allowing disparate computers to communicate. Banyan reportedly intends to resell FTP's $575 PC/TCP for OS/2 to users migrating to the recently announced 4.10 version of Vines. However, Banyan has yet to announce when it will make FTP's software available.

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The time it takes to pinpoint a LAN problem is directly proportional to its gravity.

—*Murphy's Law, v.1.7*

Spectrum

CONTINUED FROM PAGE 53

companies that are currently testing the product.

Scoggin explained that he took a chance on testing Spectrum because of his solid experience with Cabletron's hardware technology, service and support. Scoggin, on his fourth Spectrum beta-test version, is "now ready for prime time," he said, having filed a letter of intent to purchase.

To stave off industry uneasiness about a once-cabling company selling and supporting such an expensive and important product against the likes of Digital Equipment Corp., IBM and others, Cabletron said it has added 35 Spectrum support people during the past six months and currently has the capability to install three Spectrum sites per week. In addition, Cabletron Chairman Craig Benson has pledged that he "won't sell more product than he can support."

Mike Prudhomme, a senior engineer at systems integration house SSDS, Inc. in Littleton, Colo., commented, "Perceptionwise, Cabletron is at a disadvantage because a lot of people don't want to spend that kind of money unless it's with IBM or DEC. However, those vendors only have six- and seven-member programming teams for their enterprise managers; Cabletron, on the other hand, has a 40-person team."

Prudhomme has been using Spectrum since last August and "probably will purchase it," he said. In addition, he has recommended the product to large networking customers such as the federal Veterans Administration and Lockheed Corp.

Turico and Scoggin said that one current gray area involves where the responsibility will lie for keeping Spectrum modules updated with equipmer software upgrades. Another shortcoming is that the product currently supports no wide-area networking equipment.

Turico is now designing his own Spectrum module for his Codex Corp. 6290 fast-packet multiplexer. Scoggin does not want to invest in the development effort, so he said he will stick with separate management systems for now.

Spectrum select

Users and analysts agreed that Spectrum is not for the "casual" user with a relatively simple network. They paint a profile of the product's target audience:

- Operators of large corporate internetworks (generally 1,000-plus nodes) that are multivendor in nature.
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- Those who want to meld multiple existing network management systems.

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Network Systems.

Teleport net adopts Sonet

BY JOANIE M. WEXLER
CW STAFF

CHICAGO — Timing and economics have allowed Teleport Communications-Chicago to offer alternative network services based on the emerging high-speed Synchronous Optical Network (Sonet) fiber-based technology.

Because the New York-based Teleport Communications Group's Chicago network is new and Sonet standards are gelling, the carrier decided that the 15-mile Chicago-area fiber network might as well start at Sonet's 2.5G bit/sec. speeds. Teleport-Chicago also completed interconnect negotiations with Illinois Bell Telephone Co. this month, giving users a broader choice of network configurations. Sonet interfaces in the circuit-terminating equipment in Illinois Bell's central offices and customer premises equipment allow users to integrate incompatible transmission devices, according to Chuck Buckman, vice president and general manager of Teleport-Chicago.

Sonet standards eliminate the signal conversion that is necessary among different vendors' equipment, and the technology passes data at fiber's high speeds.

Most users turn to bypass carriers such as Teleport for disaster recovery. Prominent users are those with mission-critical financial and securities applications, and so far, Teleport-Chicago has signed up Telerate Systems, a division of Dow Jones & Co., and Montgomery Securities as Sonet customers.

Buckman said Teleport-Chicago is using the "full complement" of AT&T Sonet equipment. Because AT&T is likely to be a standard-setter for Sonet, he said, "we won't likely have to retrofit our office when the standards are finalized."

Teleport-Chicago is one of seven Teleport Communications Group carriers in the U.S. To date, Teleport has successfully negotiated interconnect agreements with Illinois Bell, New York Telephone Co. and New England Telephone Co.

Your most crucial new project will always need Token Ring if you already have Ethernet installed.

—Murphy's Law, v.1.8

Virtual servers lighten net load

Software lets key data stay on workstations, off host

BY JIM NASH
CW STAFF

Software that turns all Apple Computer, Inc. workstations and servers on a network into a giant virtual file server is helping some information systems managers speed up bogged-down systems.

Trading large or often used files and volumes on an Apple network can slow the network's performance during peak times. One solution, a virtual server, lets employees keep key data on their workstations and still make it available for other users who need file access less often.

Datachub, an application from International Business Software, Inc. in Sunnyvale, Calif., automatically collects information about files and volumes stored throughout an Apple network. It presents workstations with the name and status of files under a single icon as if the files were stored on a single file server.

Like dedicated devices, virtual servers offer a single place to look for files. They allow key data to be shared from all networked devices, much like peer-to-peer networks do.

Managers who have used Datachub said the application decreases network traffic because employees are able to keep certain files on their own machines. In addition, they said, they are seeing productivity increases because employees unfamiliar with the data's location are able to find files and volumes quickly by simply looking for the file names.

"Our network is really intense," said Rajan Dev, systems director at The Understanding Business in San Francisco. "We had 35 users on an Appletalk network with some people sending image files to the two servers. It was pretty crazy," Dev recalled. A division of Harper Collins Publishers, Inc., The Understanding Business designs and publishes travel guides.

"The network would crawl to a halt," he said, when image files were sent to or taken from the company's Apple Macintosh IIs with 600M-byte hard drives. Dev said those image files now can be kept on an individual's workstation and still be accessed by other employees.

A spokesman for International Business said Datachub, which takes up 415K bytes of memory, pools files for networks as large as 76 workstations whether or not a server exists on the network. Larger user groups split into zones that can access one another's workstations. Datachub runs over Appleshare and Localtalk, borrowing their security features.

Users assign access privileges to their folders with a single administrator maintaining access to all documents. Datachub updates itself by reading "keep alive" messages transmitted on the network.

"We found [Datachub] was most successful in small work groups," said Eric Epstein, senior data communications analyst at U.S. Sprint Communications Co. Ltd. Partnership in Herndon, Va. Epstein said Datachub was used heavily by Sprint's contract proposal department, where large contracts containing pages of boilerplate legalese are passed to various employees for their specific technology amendments.

Datachub costs $395 for a three-user license, $795 for 10 users and $3,250 for 50 users.

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Tandem adds to OSI functions

BY JEAN S. BOZMAN
CW STAFF

CUPERTINO, Calif. — Once isolated in a proprietary systems fortress, Tandem Computers, Inc. is fortifying its bridges to the open systems world by adding to its collection of Open Systems Interconnect (OSI)-compatible networking software.

Tandem announced, but did not deploy, two new OSI-compliant products earlier this month: OSI/FTAM for its proprietary Nonstop systems and FTAM-UX for its Integrity S2 Unix machines. OSI/FTAM is due for shipment to customers in the third quarter of 1991; FTAM-UX will have limited availability in the fourth quarter of 1991, according to the company.

Tandem said the products are as much a statement of commitment to open systems as advances in the firm's file-transfer offerings. They support remote-file access and the ability to create, delete and modify files between dissimilar computers in an OSI network.

"We have a lot of large users who are handling large volumes of data and managing networks of heterogeneous systems," said Corinne DeBra, Tandem's communications products marketing manager. "In such large networks, it's important that you have flexibility."

The FTAM products may have been offered, in part, as placeholders for more comprehensive file-transfer systems planned by standards committees, such as the international CCITT X.500 protocol. "Tandem doesn't want to commit to X.500 before it's fully defined by the standards committees," explained Chris Christiansen, an analyst at Meta Group, Inc. in Westport, Conn.

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[illegible] fiber optic cable completed. 1990 *Sprint announces first commercial video services to the Soviet Union. Sprint introduces first nationwide ISDN capabilities.*

Fritz

CONTINUED FROM PAGE 53

ment that vendor and carrier miscalculations have led to the perception that ISDN is in trouble.

Vendors complain that the CCITT and the American National Standards Institute have been too slow in getting the standards out. Some vendors even go so far as to call ISDN an unstandardized, immature service. That argument usually comes from vendors who missed the ISDN boat in the first place and need to somehow justify their lack of foresight. Such vendors usually have no plans for ISDN development and frankly, their arguments are beginning to show their age.

The CCITT defined an extensive set of ISDN standards that were released in 1984 in the Red Book and redefined four years later in the Blue Book. According to Irmer, "The Blue Book ISDN standards are available, and they are stable."

There is, however, a lack of applications unique to ISDN. This is a classic case of who has the ball. Users, vendors and carriers have all looked to one another for

> "IT SIMPLY TAKES time for the user community to accept new technologies."
>
> THEODORE IRMER
> CCITT

ISDN applications development. Irmer acknowledges that the CCITT should have spent more time addressing ISDN applications development. "We should have tried to develop applications to meet the needs of the customers and spent less time dealing with the services that run under those applications."

Inadequate marketing is also a problem. Some carriers got caught up in the excitement of preannouncing ISDN services but failed to announce ISDN tariffs or assemblies. The preannouncements served to dull interest and slow user response to the new service. IS directors are interested in bottom-line costs, not unpriced pre-announcements.

Among vendors and carriers, there is a lack of understanding about ISDN's capabilities and limitations. If those who market ISDN customer premises equipment and services cannot understand and accurately communicate ISDN features, users can hardly be expected to line up for the service. Thus, the age-old ISDN question remains: "That's nice, but what do you do with the stuff?"

Vendors, carriers and users must learn from past experience and move on, Irmer suggests, instead of fixing blame. "There is more value in determining what factors will promote customer migration to ISDN," he says.

Clearly, setting attractive tariffs is one of ISDN's most important success factors. Carriers and regulators must cooperate to make ISDN services affordable. Interestingly, the CCITT standards have something to say about ISDN tariffs. They recommend that ISDN lines be coordinated with analog line costs. For example, an ISDN Basic Rate Interface (BRI) offers about twice the call capability of an analog line. So, it seems reasonable to tariff a BRI at approximately twice the cost of an analog line.

The CCITT also favors "nondiscriminatory" tariffs. Such tariffs do not differentiate between voice and data use of the B channel. Also, carriers should be careful about charging for "extras" such as Calling Line Identification, packet charges and connect time on local data calls. Such charges produce user caution in deploying ISDN services. Eventually, such conservatism will be warranted. However, in these early days of ISDN deployment, carriers must be willing to do whatever is necessary to get the service out to the user community at low cost.

Fritz is a data communications analyst at West Virginia University in Morgantown, W. Va.

NEW PRODUCTS

Micro-to-host

Century Software has announced Tinyterm, a $295 asynchronous terminal emulation software package.

The product connects DOS-based personal computers to Unix, The Santa Cruz Operation Xenix and Digital Equipment Corp. Ultrix and VMS platforms and includes six exact terminal emulations. The memory-resident program allows users to concurrently run one application on the host and one on the PC.

A network version, costing $395 for a five-user license, supports more than 20 common network systems, the firm said.

Century Software
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(801) 268-3088

Network Software Associates, Inc. has added an Integrated Services Digital Network (ISDN) driver for its Adaptsna 3270 terminal emulation software.

Produced in conjunction with Teleos Communications, Inc., the product allows ISDN communications between IBM Personal Computer AT- and XT-bus-based machines and IBM 3174 controllers. The driver uses the ISDN Data Link Control protocol.

Adaptsna 3270 costs $245.
Network Software Associates
39 Argonaut
Laguna Hills, Calif. 92656
(714) 768-4013

California Software Products, Inc. has introduced Select, a software package that integrates midrange data into personal computer applications.

The product works with third-party PC word processor, spreadsheet and database file formats. It accesses data from IBM Application System/400s and other midrange computers with PC support. A 5250 emulator or Token Ring card is required.

Pricing starts at $1,000, ranging upward according to system model.

California Software Products
525 N. Cabrillo Park Drive
Santa Ana, Calif. 92701
(714) 973-0440

The Bluelynx 5250 Local twinaxial adapter board from Micro-Integration Corp. supports 5250 connectivity for DOS, OS/2 and Microsoft Corp. Windows 3.0.

The 5250 Local connects personal computer users to IBM Application System/400 or System/32, 34, 36 and 38 hosts over twinaxial or twisted pair wiring.

The board costs $895. A $295 software upgrade allows users to port to a different system.
Micro-Integration
215 Paca St.
Cumberland, Md. 21502
(301) 777-3307

Gateways, bridges, routers

Rad Network Devices, Inc. has announced Shortest Path First (SPF) routing on a Token Ring bridge/router, the RTB 16.

The product, which is field switchable between 4M and 16M bit/sec., optimizes source routing through wide-area networks via the SPF algorithm. It also offers a traffic prioritization network management feature and full Integrated Services Digital Network support.

Pricing starts at $5,995, depending on the number of network links.

Rad Network Devices
Suite 600
7711 Center Ave.
Huntington Beach, Calif. 92647
(714) 891-1964

Interlink Computer Sciences, Inc. has announced Sns/Printq, a software module for the company's Sns/SNA Gateway.

Sns/Printq enables Digital Equipment Corp. VAX users to access IBM Systems Network Architecture (SNA)-linked printers through local VMS print queues. Users can specify a delayed print time, making off-hours printing possible.

A license for up to three VAXs costs $22,950; a full-site license costs $49,950.
Interlink Computer Sciences
47370 Fremont Blvd.
Fremont, Calif. 94538
(415) 657-9800

Gateway Communications, Inc. has introduced a four-port Ethernet hub/adapter and accompanying expansion card.

The G/Ethertwist AT Hub Adapter combines an Ethernet adapter and a four-port 10Base-T hub on a single card. It allows users to build an unshielded twisted-pair network of up to five nodes using one expansion slot on the host computer.

Two G/Ethertwist AT Hub Expander cards, with four additional ports each, can be attached to each Hub Adapter.

The Hub Adapter is priced at $800. Each Hub Expander card costs $400.
Gateway Communications
2941 Alton Ave.
Irvine, Calif. 92714
(714) 553-1555

Electronic mail

Alisa Systems, Inc. has announced availability of Alisamail 2.0.

The Digital Equipment Corp. VAX-based electronic mail package integrates VMS mail systems and Microsoft Corp.'s Microsoft Mail. Version 2.0 features better defined installation procedures and management services and eliminates unnecessary VAX overhead and network traffic, according to the company. Alisamail also runs on top of standard Apple Computer, Inc. Macintosh-to-VAX communications software.

The price is $3,000 per 10-user license or $17,500 for an unlimited number of users.
Alisa Systems
Suite 175
221 East Walnut St.
Pasadena, Calif. 91101
(818) 792-9474

Diagnostic equipment

Spider Systems, Inc. has unveiled a system for remote monitoring and analysis of multisegment Token Ring local-area networks.

The Spiderprobe B130-R, a self-contained tool, monitors network segments and reports to a central Spideranalyzer 325. The probe's abilities include statistical error reports, hardware tests, packet capture and seven-layer protocol decoding.

The Spiderprobe costs $3,450, including protocol decodes up to the transport layer. Optional higher level decoding ability costs $1,500.
Spider Systems
12 New England Executive Park
Burlington, Mass. 01803
(617) 270-9818

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Candle's AF/OPERATOR®, AF/REMOTE™, and AF/PERFORMER provide integrated, automated solutions in three key areas: automated console management, remote control, and performance management. That's why customers around the world have selected Candle as their partner in automation.

Candle delivers the vision of what 90's automation is all about. To learn more about how we can prevent outages in *your* data center, just call **(800) 843-3970** today and ask for Department 315.

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MANAGER'S JOURNAL

EXECUTIVE TRACK

James E. Hopper has been named vice president of information systems and chief information officer at **A. B. Dick Co.**, a Chicago-based manufacturer of document publishing systems. He reports James Bast, the firm's president.

Hopper spent 11 years in senior positions at Tenneco, Inc., most recently as director of systems and computer services at Packaging Corporation of America, a Tenneco subsidiary. Before joining Tenneco in 1980, he worked at companies including Ernst & Ernst (now Ernst & Young) and IBM.

Hopper holds a bachelor's degree from Lamar University in Beaumont, Texas, and an MBA from Northwestern University in Chicago.

.....

Michael J. Williams was named vice president of data resource management at the **Federal National Mortgage Association** (Fannie Mae) in Washington, D.C.

Williams joins Fannie Mae from the information technology consulting group at KPMG Peat Marwick, where he was a senior manager in the strategic systems practice specializing in executive information and decision support systems. He has also worked at Du Pont Co.

He holds a bachelor's degree and an MBA in finance, both from Drexel University in Philadelphia.

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Denis M. Brown has been named director of the **U.S. Department of Defense Communications Agency's** Center for Information Management in Washington, D.C.

Brown was most recently director of planning at Martin Marietta Corp.'s Computer-aided Productivity Office, where he was responsible for the firm's IS planning.

Brown retired from the U.S. Air Force as a brigadier general. From 1983 to 1988, he was deputy assistant chief of staff for command, control, communications and computers. He holds a master's degree in computer systems from Colorado State University.

IS keeps Sea-Land on the move

CEO Alex J. Mandl has both his hopes and fears for information technology

Alex J. Mandl, a man who took a $3 billion global shipping company and restructured it from stem to stern, is worried about how much he has to rely on information technology.

"You have to be absolutely sure that it all works," says Mandl, chairman and chief executive officer of Sea-Land Service, Inc. "It does concern you because when you have an outage, everything in 80 shipping terminals around the world stops. It's a little scary."

Mandl took the helm of Edison, N.J.-based Sea-Land in 1988 under a mandate from John W. Snow, president of parent company CSX Corp., to improve the company's return on investment by earning as much as it costs Sea-Land to raise capital. Mandl initiated sweeping changes to push decision-making power away from corporate headquarters to the company's four regional divisions.

Mandl spoke recently with *Computerworld* Senior Editor Michael L. Sullivan-Trainor about the following aspects of information systems at Sea-Land:

• On the importance of information resources:

"What we're all about is the ability to combine a variety of transportation modes — trucks, ships and rail services — into one cohesive, seamless, door-to-door service from anywhere to anywhere in the world. Tying together all those components, when you have thousands of containers and a shipping terminal system that covers the globe, requires an enormous network of information and communications resources.

"If you make a decision about one part of this complex system, it will impact the rest of the system and you have to figure out how all that happens. That's not something you do with a piece of paper and a pencil.

"For example, when the situation in

Continued on page 76

THE CEO VIEW

Kenneth Chen

The CEO: *Alex J. Mandl, 47; BA Willamette University; MBA, University of California at Berkeley*

The career: *Chairman and CEO of Sea-Land Service, Inc., 1988-present; senior vice president (various finance, planning and corporate development positions) at parent CSX Corp., 1980-1988; finance positions at Boise Cascade Corp., 1969-1980*

Accomplishments: *Brought information resources into the day-to-day decision-making process; redefined technology applications to allow new overseas partnerships; doubled size of the company in sales from $1.5 billion to $3 billion; reorganized sluggish organization to make it more nimble*

Technology goals: *To further integrate information technology into the business by rotating managers among functions; to find places where information systems can provide market differentiation*

HMO competitors team up to set standards

BY JEAN S. BOZMAN
CW STAFF

Information systems managers from 10 of the largest health maintenance organizations (HMO) in California are joining forces to forge new data standards for their adolescent industry. Their mission is to create a new form of electronic data interchange to simplify multiple reporting formats used by the state's largest HMOs to track patient care.

"This is an incredibly competitive industry, with 10 major players in the California market," said Thom Hubbell, director of operations development and technical assessment at Blue Cross of California's California Care division. "The reason we're doing this is mutual survival."

The group has no formal structure or name; it just goes by "HMO/Information Services Group." Yet, it dares to go beyond national attempts at the same thing, believing that a small regional group is more effective for active cooperation. Among its members are IS directors from Pacificare Health Systems, Inc., Kaiser Permanente, Maxicare Health Plans, Inc. and Health Net, whose groups collectively serve hundreds of thousands of HMO members.

"Sometimes we trade war stories," said Charlotte Jenkins of the Beverly Oncology cancer care organization in Montebello, Calif. She is an HMO operations consultant serving on the committee. "We talk about what has worked in the past and what hasn't worked. Many of us feel that vendor solutions for HMOs have proven to be too narrow."

Among near-term aims are the creation of a unified set of data-entry formats that can be used by group medical practices and medical care contractors to report on HMO patient care. A proposed set will be presented to the American National Standards Institute standards committee this summer.

COMMENTARY

N. Dean Meyer

Dispersing IS isn't an answer

Decentralization? Sure, users want control over information systems. It's an integral part of their businesses, and everyone wants to control his own business.

In the past few years, the fad has been to break up corporate staff functions and assign staff members to user divisions. This puts users in the driver's seat and seems to make business, more than technology, drive IS expenditures.

But shipping corporate head count out to the divisions is not the only way to give users control. And willy-nilly decentralization has some serious disadvantages.

For one, scattering high-tech staff members leads to less specialization. For example, a company might be able to afford just one neural networks expert, not one for every division. Decentralized IS staff members are forced to be jacks of all trades — all platforms, applications, end-user computing tools and disciplines. Because no one can be an expert at more than one thing at a time, decentralized technologies are forced to be mediocre at everything or to narrow their scope and become "solutions in search of a problem."

Another problem is integration. Many of the high-payoff opportunities now lie in cross-functional systems that transcend organizational boundaries. Decentralized staffs are less likely to see these. Even if they band together to pursue such opportunities, their independent, parochial designs make it difficult to build an integrated architecture.

Still another problem is management. Structuring, coaching and inspiring IS professionals is a profession in itself, and user executives are ill-equipped to lead these specialists.

In addition, decentralization destroys career paths for IS professionals. Although there is plenty of room for generalists to participate in the IS function, we still need specialists to produce world-class excellence in technology design. Such gurus will not be attracted to what will be dead-end jobs for them in user organizations.

And finally, decentralization is expensive. Software licensing costs skyrocket, volume discounts disappear, and redundancies proliferate.

So what's the alternative? It's simple: Don't decentralize head count; decentralize power.

Decentralization is a backlash response to an unresponsive and perhaps controlling corporate staff function. Why would corporate staff behave so poorly? It may not be the fault of the IS professionals but rather inherent in the design of the internal economy.

Think of the corporation as a marketplace and the IS staff as a business within a business. If this internal vendor were customer-focused and competent, it would compete effectively for the user's business. Decentralization, on the other hand, is a loss of market share. It indicates a vendor that is failing.

Most companies are run as a centrally planned economy — like those that failed in the Eastern bloc. With budget flowing top down (from the "Central Soviet"), the corporate IS staff doesn't have to compete for business. It is an unregulated monopoly, and it behaves like a bureaucracy.

An internal market economy, by contrast, gives users the budget, and corporate IS staff must earn their revenues through chargebacks — as a vendor in competition with outside providers and the users themselves. In this free market, users hold all the strings. Do you feel your grocery store controls you, or is it the other way around?

To earn market share, the IS staff must be responsive to its clients' needs and produce world-class products and services at competitive prices. Corporate objectives (such as architecture planning) can still be subsidized, but customer focus is built into the culture.

Internal vendors are free to structure and manage as they wish, without outside interference or arbitrary caps on head count. The marketplace automatically controls the level of expenditures and keeps staff members honest.

Chargebacks alone may cause more trouble than good. But a carefully planned migration to a market economy can, over time, build informed clients and entrepreneurial staff.

With root causes understood, problems can be corrected systematically. If problems are caused by the misbehavior of a monopoly, the solution should be sought not in structural change such as decentralization but rather in the design of an effective internal economy.

Customers may wish to hire their own purchasing agents, and internal vendors certainly should designate account representatives. But users are best advised to "stick to their knitting" and demand a healthy corporate IS function rather than dismantle it and try to run it themselves.

Meyer is founder and president of NDMA, Inc., an information systems management consulting firm in Ridgefield, Conn.

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Why are more and more smart companies embracing object technology? Because they want to get an edge on the competition.

It's true. Enterprising companies are betting on object technology as the way to decrease development time, lower the cost of maintenance, and reduce the complexity of applications programming.

Object World will bring together users and vendors of object technology for five intensive days of seminars, conferences, and exhibits. It all takes place June 3-7 at the historic Fairmont Hotel in San Francisco.

A PRACTICAL LOOK AT WHAT'S AVAILABLE TODAY.

Object World is the first show of force in object technology. And the first industry event to focus exclusively on its commercial aspects.

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Attend dynamic half-day seminars like: An Executive Briefing on Object Technology (OT); Building Commercial Object Applications; Integrating Legacy Systems with Objects Systems; OT Tools and Building Blocks; Surviving the Move to Objects; Adding Sizzle to Object Applications; The Emerging Software Components Industry; and Integrating Objects and Databases.

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Or take part in hard-hitting program sessions divided into four separate tracks:

- *The Applications Track* focuses on managing the development process, analysis and design, applications frameworks, and the future of object management systems.
- *The Management Track* covers subjects like gaining competitive advantage, adopting object technology, leapfrogging technologies with OT, and migration planning.
- *The Technology Track* explores topics like needs assessment; evaluating languages, environments, and databases; and standards and user groups.
- *In-depth Applications Case Studies* give you a close-up look at the many companies who are running object-oriented commercial applications today—the successes, as well as the failures.

VISIT THE LEADERS OF OBJECT TECHNOLOGY.

In between you can stop by our exhibit hall and talk with companies like AT&T, Borland International, Digital Equipment Corp., Digitalk, Hewlett-Packard, Parc Place Systems, Servio Corp., Sun Microsystems, and more—the people who are shaking up the present and shaping the future of object technology.

WHO SHOULD ATTEND?

Chief information officers, IS managers, MIS/DP managers, technology planning managers, managers of systems development/architecture, programming supervisors, and software development managers. In short, anyone and everyone who wants to explore the potential of this rapidly growing technology should be in San Francisco June 3-7, 1991.

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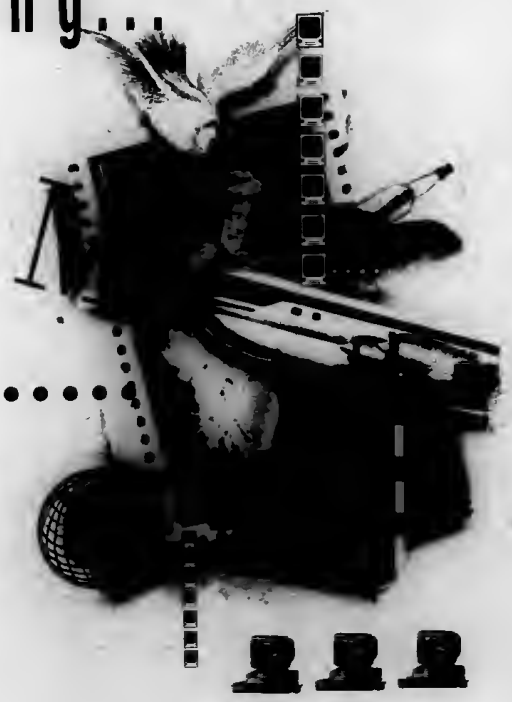
NEWS AND VIEWS APRIL 1991

Messaging...

It's More than Just Mail



Six Points to Keep in Mind When Building a Corporate-Wide Electronic Messaging System

Electronic messaging is about communicating with as many people as you want — quickly and easily, using the desktop system of your choice. Pockets of users, on small networks that aren't on speaking terms, are just what you want to avoid. Messaging has to be the most open kind of computing possible, tying your corporation together and linking it to the outside business world.

Digital has built the largest private online messaging system in business today. We've found the following six points critical to the building of our corporate-wide electronic messaging system, as well as to the systems we've built for other Fortune 500 companies.

Standards Are Important in Building Your Messaging System

Open systems are as important in messaging as in other aspects of computing. Open means standards, and standards free you from the restrictions inherent in proprietary messaging networks. Open systems messaging allows you to link proprietary networks, so messaging isn't confined to pockets of users who can't communicate with the corporation as a whole.

With open-systems messaging, you can preserve your investment in existing equipment yet build applications that work throughout your expanded business environment. You can grow an open messaging system by adding gateways and users; you can begin with a messaging system for two users, then expand it to support thousands more. An open messaging system lets you move your resources physically — move terminals, gateways, and MTAs (message transfer agents), all without costly, time-consuming adaptation.

To remain competitive, organizations of the future will have to become flatter, with fewer levels of management. Open systems messaging lets you build distributed, peer-to-peer networks to match this changing business structure.

Whatever the messaging medium, quick, easy, and open communications is the goal.

Many corporations are planning for the '90s with open systems messaging. Digital has used open systems messaging for years — and is helping other corporations implement it as well.

X.400 Is the State-of-the-Art Messaging Backbone

X.400 provides a standard interface for messaging, breaking down barriers so that mail systems from multiple vendors can be connected seamlessly. All major mail vendors are developing systems that interface with X.400. The single, proprietary system appears headed for extinction.

X.400 is a robust backbone, offering interoperability with a predefined set of services. It is standardizing messaging as thoroughly as plugs and appliances are standardized to fit one another to utilize electricity. Messaging products will, in effect, "plug into" the X.400 backbone.

Backbones other than X.400 can be risky. They don't offer a known set of services; they're not robust. They may weaken, especially in the management and directory services areas. With use, the chain linking your multivendor systems grows progressively weaker as the proprietary gateways and systems struggle to work together.

Many messaging vendors have committed to the X.400 international standard, but Digital has it today. Based on X.400, our MAILbus application software set can link systems and applications from over 40 vendors and public carriers into a corporate-wide electronic messaging system. MAILbus is in fact an integral part of Network Application Support (NAS), our comprehensive implementation of open systems.

continued ➤

[redacted]

Powerful Incentives to Upgrade to a VAX 6000 System

Purchase a new VAX 6000 system or a VAX 6000 CPU upgrade via an Easy System Upgrade, Conventional System Trade-In, or an In-Cabinet Board Upgrade, and you'll get from Digital AT NO ADDITIONAL CHARGE:

- An InfoServer 100, which will allow you to lower your cost of ownership by delivering to everyone on your LAN a common information base that provides SCSI disk and CD-ROM services as if the disks were locally attached.
- A System Performance Analysis Service by a trained Digital software professional to ensure that your new VAX 6000 system is tuned to meet your business needs.
- The right to use the VAX Performance Advisor (VPA) through December 31, 1991. VPA is a system performance analysis tool that allows you to monitor and manage your system today, while simultaneously planning for tomorrow's resource requirements.

To take advantage of this special offer, call our Technical Consulting Center today, at 800-343-4040, ext. 545. Orders must be received by June 14, 1991, with a ship-request date no later than June 28, 1991.

A Messaging System Is a Transport System

A messaging system allows you to use electronic mail to send messages to another corporation, person-to-person, terminal-to-terminal. It allows you to use EDI to move purchase orders, shipping orders, invoices, and payments between corporations.

Digital's MAILbus lets you build a true transport system. It lets you use electronic mail, EDI, FAX, and TELEX — on the same backbone. You don't need to build transport systems for each individual application. You install MAILbus once — for all of these applications. The flexibility inherent in standards and in MAILbus allows all these applications to run over the same network transport.

Your Messaging Directory Opens Up Information to Users

Your messaging directory should open up information to users, not shut them out.

The directory must support both the network and its authorized users, keeping track of employee names, addresses, job titles, and phone numbers. It should allow authorized users or applications to access devices or information from local and business-wide networks. Access should not stop at the front lobby door. You also need external access to directories outside your business, coupled with security features that protect your resources from intrusion by unauthorized users.

An "open yet secure" directory has many benefits. It eliminates the danger of a single point of failure. It improves performance, and it allows management of the directory to become distributed. The directory becomes scalable, serving a local or a worldwide network. Our MAILbus directory works in just this way.

A Robust Messaging Network Can Be Managed with Flexibility

A messaging network ought to be flexible enough to accommodate various levels of management. You should be able to choose whether network management is geographically distributed, centrally based, or a combination of the two.

You should be able to easily manage your messaging network. In fact, network management should work for you, monitoring the network and reporting when corrective action is needed.

Such network management features are built into MAILbus. MAILbus also lets you incorporate new technologies, systems, and applications from Digital or other standards-based vendors, without changing the way you use the messaging system.

A Messaging Network Is User Friendly

A good messaging system offers menus, help screens, management reporting tools, and configuration tools. Digital's messaging systems have these features, making them easy to set up, use, and manage.

Be sure to consult your users as you plan and implement a messaging network. Let them choose the desktop devices needed to satisfy job requirements — Macintosh systems, DOS machines, character-cell terminals, for instance. Then train your users thoroughly, so that they can then take full advantage of network resources and services.

Get the Message

Digital has the experience and breadth of products to be your vendor for corporate-wide electronic messaging. Our messaging consultants can help you plan, install, and configure your messaging system. For more information about MAILbus and Digital's other messaging products, call 800-DIGITAL (800-344-4825), or your local Digital sales office.

Third-Party Software Support

Works in the Real World

Digital has been in the business of supporting multivendor equipment since 1983. Via Vendor Equipment Services (VES) we support more than 8,000 different hardware products manufactured by 850 different vendors. VAS carries our service commitment into the multivendor software arena.

Multivendor computing is a reality. But consistent, comprehensive support for your multivendor environment is not always easy to come by. Digital is changing that.

With the recent inttoduction of Vendor Application Services (VAS), Digital now supports more than 70 selected thitd-patty software products that run on Digital or Digital-supported hatdware, including Simpact, SCO UNIX, LOTUS 1-2-3 for VMS, and the Wollongong Group WIN/TCP. As a result, you can now enjoy the same superior level of service you've come to know from Digital, regardless of yout multivendor equipment configuration.

We're committed to providing you with a single source of support. Our software professionals receive extensive training directly from the software vendor — an arrangement that combines Digital experience with a specific knowledge of your software applications.

One call to Digital sets VAS in motion. We serve as the single point of contact, managing the critical link among multivendor configurations. This approach ensures a centralized service response and reduces confusion and time spent over service arrangements.

Depending on your products and your service needs, a number of VAS support options are available from Digital.

Telephone Support: Trained Specialists on the Other End of the Line

When your users encounter a software problem, they can dial a toll-free numbet and speak directly to one of our software specialists.

These specialists maintain an information database and links with third-party software vendors to guarantee timely, total support for all your system needs. This arrangement completely eliminates the confusion over multiple vendors and means that Digital is not just your first point of contact, but the ONLY source of support you'll ever need.

Trained on both Digital and non-Digital software, our specialists' expertise encompasses the entire system. They have the ability and the tools to define and resolve your application problems, so you can get back to working productively again.

Petihaps most importantly, we are always just a phone call away — worldwide, 24 hours a day, seven days a week for most products.

Remedial Support That Maintains High System Availability

When you need more than routine telephone support, our skilled professionals are at your disposal. For most third-party software products, our specialists can reproduce and then diagnose your particular problem. They can download an appropriate solution in a short period of time and, whenever necessary, go directly to your site.

Software Media and Documentation Updates That Keep Your System Current

No matter how skilled your staff or how minimal your software maintenance requirements, current software and documentation updates can help you keep your system running at peak efficiency. Provided automatically on a regular basis, these updates incorporate technical changes, product improvements, and documentation refinements — all features geared to improving your system's efficiency, performance, and productivity.

Service Excellence: An Ongoing Commitment

At Digital, service has always meant giving you total support coupled with quality and value. We're committed to the continued expansion and improvement of our service programs — to give you more peace of mind in the "real world" of multivendor computing.

The strength of our commitment is evidenced by continuing high marks in independent customer surveys evaluating satisfaction with service delivery, as well as by industry consultant reports.

For more information on VAS, and other comprehensive service programs, contact your local Digital Services office.

servicenter

Here's some good news:

At our Digital SERVICenters, we now repair most popular personal computers, terminals, and printers, including those from IBM, Apple, COMPAQ, WYSE, Zenith, Tandy, Epson, and others. (This of course in addition to all models of Digital office products.)

Take advantage of this expanded carry-in service. You'll find our SERVICenters offer fast turnaround and quality service. Prices are competitive too.

Call 800-225-5385 today for more details on our SERVICenter carry-in service for Digital AND non-Digital products, including a complete list of all products on our current repair menu.

SERVICenter Labor Fees on Standard Repair-List Products

Printers, Terminals, PCs, Word Processors, Communications and Networking Devices, Monochrome Monitors	$65.00 per product fix plus parts
Laser Printers, Color Monitors	$100.00 per product fix plus parts
Office CPUs (MicroVAX and VAXstation systems, IBM and SUN workstations, for example)	$130.00 per product fix plus parts

Service contracts at equally competitive prices are also available.

STORAGE Bytes

Here's the latest word on some of Digital's storage products and solutions.

DSSI Power Migrated to VAX 6000 Systems

When it comes to high performance and data availability, the Digital Storage Systems Interconnect (DSSI) has proven itself to be an industry leader. So you'll be glad to hear that this technology now supports VAX 6000 systems.

The addition of DSSI to VAX 6000 data center systems allows you to configure dual-host VAX 6000 systems to achieve high availability, plus 40 percent improvement in storage price/performance.

New SF200 Storage Arrays, TF857 Tape Subsystems, and More

As part of this expanded DSSI solution, new SF200 storage arrays and TF857 tape subsystems provide high-performance disk storage and balanced, unattended backup for the VAX 6000 systems. The SF200 also supports dual-host capability for entry-level VAX 6000 VAXcluster systems.

Features such as high I/O rates, low access times, and lower price per megabyte, as well as conformance to our Digital Storage Architecture make these DSSI-related products a welcome addition to the VAX 6000 family.

The new SF200 storage array subsystem houses up to 24 gigabytes of storage capacity plus up to 36.4 gigabytes of tape backup — all within a single cabinet. Housing both disk storage and tape backup, the SF200 storage array subsystem offers 75 percent savings in valuable floor space over previous configuration options. Prices for the SF200 storage array subsystem range from $33,000 to $317,000.

The new SF72 storage array building block configures within the SF200 storage array subsystem. Each SF72 provides two to four gigabytes of disk capacity; up to six SF72s can be configured within the SF200. The SF72 storage array is priced from $28,000 to $52,000.

Related storage products include the KFMSA — a single XMI interconnect module supporting up to 12 disk-integrated storage elements and up to two tape-integrated storage elements in single host mode. Up to four KFMSA modules are supported on a single host system to provide 48 gigabytes of formatted capacity. The KFMSA is priced at $14,000 each. A new RF72 disk provides high-end features at competitive prices. Priced at $13,000, this one gigabyte, 5.25-inch integrated storage element is the foundation for the new DSSI storage array.

The new TF857 magazine tape subsystem offers a total of 18.2 gigabytes of highly reliable and flexible unattended backup capability — all in a streaming tape device, available with a seven-cartridge auto-loading magazine. When included in the new SF200 storage array subsystem, two TF857 subsystems can provide up to 36.4 gigabytes of single-shift unattended backup. This makes the TF857 ideal for users of VAX 6000 systems, where the need for high capacity is significant. A complete TF857 magazine tape subsystem is priced at $29,000.

DSSI offers linear performance increases with each additional Integrated Storage Element. ▼

Unattended Backup Strategy Stronger Than Ever

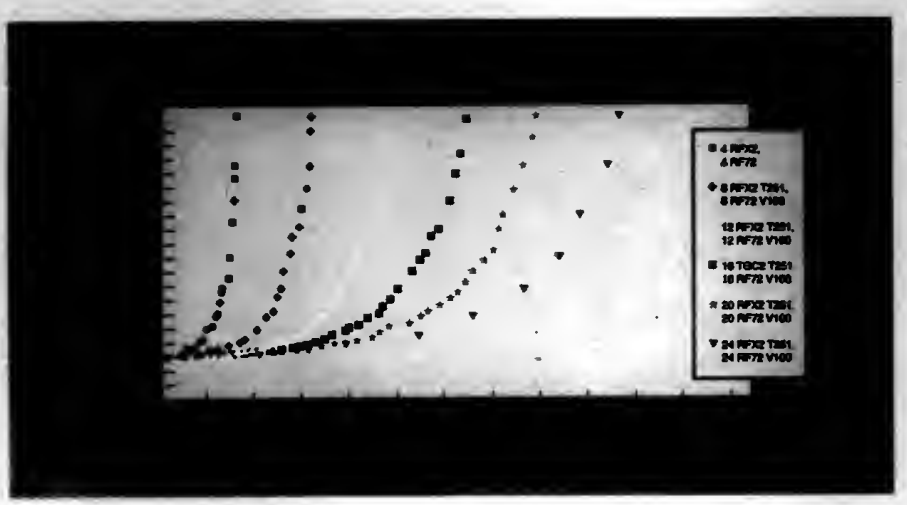
The recent announcement of another new tape subsystem (in addition to the TF857) and the extended availability of an existing tape drive, reinforce our commitment to meet the need for unattended backup for all systems.

TA91 Cartridge Tape Subsystem

Well suited for the requirements of large VAX 9000 and VAXcluster installations, the new TA91 cartridge tape subsystem delivers the highest possible aggregate throughput of any tape subsystem available on Digital systems. It provides 2.4 to 9.6 gigabytes of unattended backup capacity — just like the earlier TA90E subsystem, but with a 27 percent smaller footprint. Improved Data Recording Capability (IDRC), an important feature of TA90 family subsystems, increases cartridge capacity between two and four times, thus increasing basic unattended backup capacity to between five and 48 gigabytes (depending on the application). The price of a dual-drive TA91 master subsystem is $134,000.

VMS Support for TZK10 Tape Drive

Now the TZK10 quarter-inch cartridge (QIC) tape drive is available on selected small systems using VMS Version 5.4-2. This includes VAXstation 3100 systems and MicroVAX/VAXserver 3100 systems. The TZK10 tape drive, intended for backup and data interchange, is an industry-standard half-height QIC streaming device, with a capacity of up to 525 Mbytes. It is priced at $1,800.



Notes on chart:
To the best of our knowledge, the test results show how a particular system having the configuration(s) shown above performed in a test environment, but other units or other environments might give different results. The results are not intended as any form of a warranty or specification for the above configurations(s), and we assume no liability for the accuracy or completeness of the results.

For more information on these and other storage products, contact your local Digital sales representative, or call 800-DIGITAL (800-344-4825.)

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Speakers urge IS managers: Take the offensive

BY JOSEPH MAGLITTA
CW STAFF

TUCSON, Ariz. — It is easy being a crackerjack information systems manager these days. All you have to do is become a business whiz, mastermind technology initiatives and help propel your organization into the 21st century.

A snap, right?

Obviously, the problem with such grandiose visions of IS is that it is no easy feat to get there from here.

And where is *there* anyway?

The challenge of helping IS meet tomorrow head-on was tackled at the Society for Information Management (SIM) institutional member conference earlier this month.

The program, "Bridges to the Future: Theory and Practice," enlisted noted speakers in several fields to offer new ways of thinking about IS involvement and improvement. Following is a summary of their thoughts:

• **F. Warren McFarlan, Harvard Business School:** The days of business people saying "it's not my job" to handle information technology are over forever, according to McFarlan. Like never before, the 1990s will require ongoing cooperation among IS, general business management and midlevel user management.

"No two of these three groups can succeed by themselves," McFarlan said.

Smart business leaders see big opportunities to shorten response and delivery times, improve product quality and establish new alliances — all based on information technology.

The key to gaining these payoffs, he continued, is to focus on re-engineering and, especially, implementation. "Re-engineering is not a panacea. It can work only if you make things happen," he said.

He warned that companies who re-engineer but ignore business transformation face certain failure. In such cases, he said, "The system is a technological success, but the patient dies."

Companies must avoid three other fatal errors, he advised: expecting payoffs too fast, getting in too early on the technology curve and pursuing IS projects with inadequate payoffs. Companies should ask, "Is it a big enough step to warrant the pain?" he said.

Commenting on how the use of IS should be conceptualized in organizations, McFarlan said: "There's a lot of garbage being written in the academic journals today about whether IS is a defensive weapon or an offensive weapon. The bottom line is that you will be as fast as your competition, or the business history department at the *Harvard Business Review* will be interested in poking around the cadaver of your corporate records."

• **John Elkins, The Naisbitt Group:** "Anyone involved in five-year strategic planning is wasting their time," declared Elkins, president and chief executive officer of The Naisbitt Group, an Evergreen, Colo., consultancy.

Today, the rapid pace of economic, social, technical and political change has reduced the realistic planning horizon to about 18 months, Elkins said, and that includes IS. "We have to use organizations in the most flexible way to create systems to monitor that change," he said.

While markets will become more global, Elkins predicted, research and development will become more regionalized. IS supporting both activities will undergo careful scrutiny as cost pressures mount.

"Many companies are unable to get off the spending bandwagon for fear they are not doing the right thing. But in the last two or three years, there has been a serious re-examination of what the millions we have invested in technology are really returning."

Elkins also said the focus of IS use will increasingly shift to generating revenue while continuing to look for new ways of reducing costs.

• **Ralph H. Kilmann, Katz School of Business, University of Pittsburgh:** The complex problems facing companies today require a new kind of problem-solving approach and organizational structure. The solution, Kilmann said, is a "networked organization," described as "an interpersonal and electronic network of people, information and influence."

Such organizations are slowly taking shape, but they must become the norm if the U.S. is to remain a global competitor, Kilmann warned. "U.S. companies must remove barriers and . . . mobilize quick, informal problem teams," he said.

These teams would include experts from several disciplines, including IS. Technologically, communications would be handled via networked personal computers and fax machines.

However, Kilmann also cautioned that such major organizational change is "tougher to do when you come out of the 'Program of the Year' mentality: quality, innovation, excellence, etc. People ask 'Why is it different now?' "

His advice to veteran IS managers? "Don't dwell in the past. Have your own vision, and take a leadership role."

INFOMART Onsite Events

MICROSYSTEMS INTEGRATION MAY 5-7

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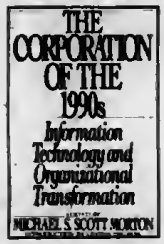
BOOK REVIEWS

Recipes for changing the organization: Some tough, some tasty

The Corporation of the 1990s
Michael S. Scott Morton, editor
Oxford University Press, $24.95

The Corporation of the 1990s offers a recipe for organizational change that is generally difficult to chew but occasionally wine-subtle.

The 331-page book is the result of MIT's Sloan School of Management's "Management in the 1990s" program.



What the book attempts to address, according to MIT's Lester Thurow's excellent introduction, is "how new technologies can change — and are changing — the way people work, the way society's major organizations are structured and the way corporations will collaborate and compete in the years to come."

The book is s collection of nine essays, three each under the headings of The IT Revolution, Strategic Options and The Organization and Management Response, and is largely written by members of the Sloan School's faculty. Their overall message is clear: Companies must change radically to survive beyond the year 2000. Unfortunately, predicting the future is not easy, particularly when so many of the ingredients are unknown.

What the professors can predict is generally obscured by the academic's tendency to equate the level of insight with the relative inscrutability of the point. Few of the essays ever approach the readability of Thurow's introduction.

Still, there are ways to glean the ample knowledge that is buried in these pages. For starters, change the way you read a book: Focus on the table of contents and the index. Read the uniformly well-written conclusion of each appropriate essay first, to determine how effectively it sums up its point. Use the index to see where topical references occur — such as "integration of business processes" or "labor-management relations."

There is also the recurring theme that technology does not replace human beings, stated most effectively in Paul Osterman's essay on the impact of information technology on jobs and skills: "High technology, standing alone in the absence of a corresponding set of human resource investments, does not seem capable of achieving comparable results" to an organization with less technological capability but better management skills.

Clearly, this is not the handbook to achieving a healthy corporation for the 1990s and beyond that it might have been. But do not ignore this book, if only because it illustrates how, in Thurow's words, "Thinking of these new technologies as something that should be used to produce information has led them to be used wrongly."

MICHAEL FITZGERALD

Tell Me a Story: A New Look at Real and Artificial Memory
By Roger C. Schank
Scribners, $19.95

In his latest book, Roger C. Schank, the director of the Institute for the Learning Sciences at Northwestern University and former director of the Artificial Intelligence Laboratory at Yale University, challenges the traditional AI assumption "that making computers intelligent means endowing them with logical reasoning abilities and detailed expertise in various domains."

Instead, Schank argues that s human model of intelligence would be based on storytelling ability. Stories, he says in the 253-page book, are the medium by which people communicate and store information; the more intelligent the person, the more subtle and varied his indexes for filing and retrieving stories.

It is an intriguing argument that is readable, persuasively written and demonstrates enormous insight into human nature.

NINA BARRETT

Knowledge Link: How Firms Compete through Strategic Alliances
By Joseph L. Badaracco Jr.
Harvard Business School Press, $24.95

Information systems managers fed up with attempting to understand the constant strategic shifts affecting their corporations can glimpse the business side of the "knowledge globalization" in *Knowledge Link*.

The 154-page book does not try to solve any how-to problems IS managers face when expanding their systems to meet a corporate global strategy. But the author successfully illustrates the important competitive role information and company-owned knowledge plays in today's business world. The book demonstrates how the globalization of knowledge through strategic alliances and company acquisitions is directly impacting the shift in the managerial structure within corporations worldwide.

MAURA J. HARRINGTON

Fitzgerald and Harrington are *Computerworld* correspondents. Barrett is a free-lance writer based in Evanston, Ill.

INTRODUCING THE RETRIEVA THAT CAN HU

When a customer requests information, how long does it take you to find that data and supply it? An hour? A day? Now, thanks to Anatrieve software from Anacomp, those days are over. Regardless of the information you store on film—bank statements, account statements, invoices, insurance policies or health care forms—Anatrieve can retrieve it almost instantly.

Or, put another way, this dog will hunt. Anything.

Ask Anatrieve where something is, and it immediately points it out.

With Anatrieve, you'll never wonder "Do we have that data, and if so, where is it stored?" Anatrieve points to the answer immediately. Because of its unique computer indexing, you can access information any number of ways: customer name, account number or other identifying information.

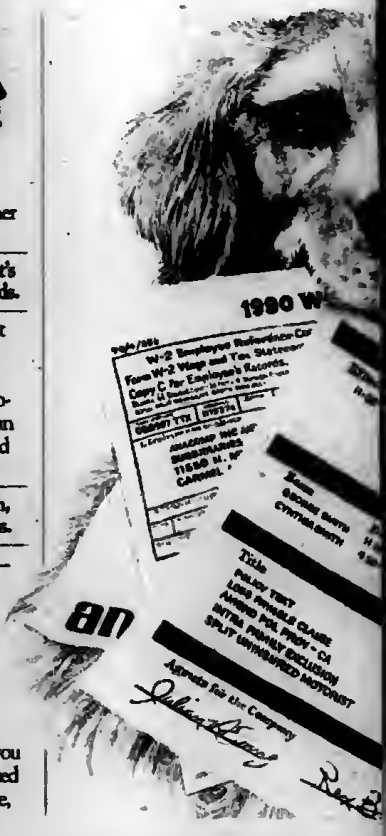
Tell Anatrieve to go fetch, and it's off and back, often within seconds.

Not only does Anatrieve point you in the right direction, it can retrieve information very quickly. When linked with intelligent, automated image retrieval devices, it can provide displays within seconds and can even provide for hard copies.

No matter what field you are in, Anatrieve brings back the goods.

No matter what the business—banking, insurance, healthcare, hospitality, government, retail—Anatrieve performs. If your company frequently receives requests for information, you can achieve major cost and time efficiencies with Anatrieve.

And only Anatrieve will tell you how to distribute customer requested information and, when appropriate,



Recession means IS stagnation

NEW YORK — Want more proof that we are in a recession? Despite all the volatility of the information systems profession, IS staff turnover is at a 10-year low.

This is according to Edward Perlin Associates, Inc., a computer professional compensation and management consulting firm. "I never thought I'd hear my client companies complain that computer staff turnover was too low," President Edward Perlin said.

In addition to the problems of lower morale and the lack of fresh talent entering IS departments, the low turnover may have a hidden disadvantage. When the economy recovers, Perlin warned, turnover may skyrocket. That is because the recession has also brought lower raises and salary freezes — resulting in dissatisfied employees.

"When the situation improves, employees who are now annoyed by low or no raises will not need much encouragement to switch jobs to gain better pay and greater opportunity," Perlin said.

Many IS departments benefit greatly from the ideas that outsiders can bring.

"This information interchange shows companies better ways to get things done, and the flow of this useful know-how seems to have dried up as staff turnover has dropped," he said.

MANAGEMENT BRIEFS

Index Group links up with Hammer to establish re-engineering center

Index Group, Inc. and consultant **Michael Hammer** have announced the creation of the Center for Re-engineering Leadership, an organization that will seek to develop and disseminate knowledge to help transform companies.

Based in Cambridge, Mass., home of Index Group, the center is scheduled to begin operations May 1. Index Vice President Steven A. Stanton will direct daily operations.

Initially, the center will bring together top business executives from 40 large companies to explore key issues in implementing re-engineering methods. Index and Hammer have collaborated since 1984 in running Priam, an information systems management joint research program sponsored by approximately 150 companies.

The **Society for Information Management** (SIM) has formed a group of select high-level IS executives to participate in joint research on IS management issues. The SIM Advanced Practices Council will consist of 30 members; a membership fee of $25,000 will be charged.

Harvard Business School Prof. F. Warren McFarlan will serve as research director, and Thomas Morin, vice president of Medtronic, Inc. and a former SIM president, will be chairman. The research will be "100% practitioner-driven," according to SIM Executive Director Henry Givray.

The council will eventually share its research results with the SIM membership. The council, which still has openings for new members, will meet again July 8.

Abbott, Langer & Associates has published the eighth edition of *Compensation in the MIS/DP Field*, a survey of salaries at all levels of IS in 622 organizations. The survey found that the highest paid position is a director of MIS/DP with 20 or more years experience administering an IS budget of $10 million or more. Among the organizations surveyed, the highest paid director makes almost $150,000 annually in salary and bonuses.

The report is available for $550 from Abbott, Langer & Associates, 548 First St., Crete, Ill. 60417 (708) 672-4200.

The **Automotive Industry Action Group** (AIAG) has published an industrywide guideline for electronic data interchange (EDI) standards. The EDI Industry Implementation Guideline was formulated by auto companies including the Big Three and large automotive parts suppliers such as TRW, Inc. and Allied-Signal Corp.

The guideline covers 14 business transaction sets related to invoicing, purchase orders, price quotes, shipping, receiving and other common business transactions in the industry.

One copy of the guideline will be sent to each AIAG member company free of charge. Nonmembers can purchase copies for $250 from AIAG, Suite 200, 26200 Lahser Road, Southfield, Mich. 48034 (313) 358-3570.

Uniforum has announced a call for papers for the 1992 Uniforum Conference scheduled for Jan. 20-24, 1992 in San Francisco. The conference will focus on the theme, "Unix: The Open Advantage." The deadline for submitting abstracts and application forms is June 1.

Participation forms are available from Uniforum, Suite 201, 2901 Tasman Drive, Santa Clara, Calif. 94054 (408) 986-8840.

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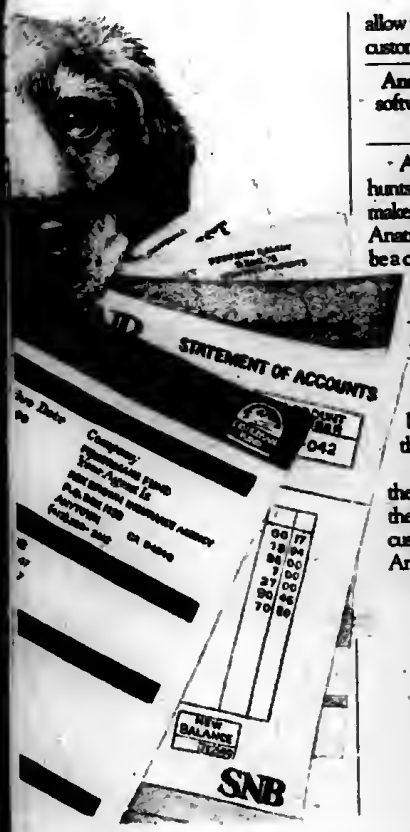

allow you to bill transactions to the customers or requestors.

Anatrieve stands alone: no other software can be this storage device independent.

Anatrieve is unique. It flawlessly hunts film-based images. But what makes it truly a breed apart is this: Anatrieve can be customized to be a common index management system for select information storage and retrieval peripherals.

Anatrieve's pedigree is flawless.

The parent of Anatrieve is Anacomp, and this software has been bred for success. Like all of the programs we create.

That's why today we're one of the 25 fastest growing companies in the U.S. Serving over 15,000 customers daily in North and South America, Europe and the Pacific Rim, we are the recognized leader in every part of the micrographics industry we serve:

COM, data service centers, consumable supplies, hardware systems and equipment maintenance.

For more information, write P. Lang Lowrey, Senior Vice President, Worldwide Marketing, Anacomp, Inc., One Buckhead Plaza, 3060 Peachtree Road, N.W., Suite 1700, Atlanta, Georgia 30305.

Or simply call 404-262-2667.

Visit us at AIIM Booth 1711

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Mandl

FROM PAGE 67

the Persian Gulf broke out, we had to reconfigure our whole system to some extent to accommodate this new requirement. You can't deal with such issues unless you have information resources that allow you to assess and understand what all the steps mean."

• On integrating information technology with the rest of the company:

"We have restructured our organization in a number of ways to ensure total cohesiveness between the people who run the business and the information technology people to make sure there is a frequent flow of leads and information and issues.

"We have done it in such a way that information technology really becomes the business and that people who operate and market the business think of themselves as individuals who are very much in the forefront of how to employ the technology to create the kind of service we want."

• On the current and future role of IS professionals:

"Before the restructuring, the information group was a good group but not part of the day-to-day business. They were not brought in and integrated into the basic fabric of the decision process. We have changed that by placing information technology people in all parts of the organization.

"These professionals provide the communication, the knowledge and the ongoing opportunity to ensure that information technology is part of the management process.

"The next step is to have information technology people run operational areas, marketing areas and shipping terminals and have business people run information technology areas. We've done some of that, and I want to see more.

"Whenever that happens, you have an enormous catalytic impact in terms of how these two functions are brought together and totally meshed."

• Where information technology hasn't met expectations:

"It doesn't meet my expectations when we don't do an adequate job of training the people to use it right. The systems usually work pretty damn well. But often, we don't provide adequate training to fully exploit the capabilities the systems have.

"Whenever I've seen something that didn't look right or things that weren't going right, more often than not the shortfall or mistake is failure to provide the right kind of training . . . to do everything with that system that it is designed to do."

INFORMATION technology "doesn't meet my expectations when we don't do an adequate job of training the people to use it right."

Alex J. Mandl
Chairman and CEO
Sea-Land Service, Inc.

• On deciding how much to spend on information technology:

"We spend between 3% and 3.5% of sales on the information technology budget. If you include all other direct and indirect user spending, the total is more like 4% to 4.5% of sales.

"That's a lot of money, and we look at how much we spend an awful lot. For a large portion of the expense, it's not a question of whether you do it or not. The major expenditure is for ongoing maintenance of existing systems. So you haven't got any choice. You have to make the assumption that you're doing it as efficiently as you can."

• On justifying new systems:

"The next question is how much more money are you willing to commit for further systems development and what kind of a return will you get. We look at those hard every time. Unless we are convinced that a new expenditure of, say, $10 million will do specific things and provide specific benefits in revenue, benefits or market share and differentiation, we won't spend it.

"We try to be as disciplined as we can to ensure that those incremental expenditures are financially fully justified.

"Those first two are the easy part. The tough part is to all of a sudden make a judgment to replace an existing system. If we replace that with a new architecture and new features, it would give us a more robust system and more reliability. But how do you justify it financially? You can make some assumptions and so forth, but that gets tough. Then you get to the point where you have to be damn sure you have the right people making the right judgments."

• On Sea-Land's business and technology goals:

"One of our principal goals is to improve the basic quality of service in terms of reliability and low error frequency — making the basic transportation and distribution service ride to the highest quality possible.

"We want to find ways to utilize our equipment more efficiently. We have containers constantly moving around the world in various ways. The challenge is to utilize those containers to get the most use out of them. We also need to provide the container for the customer as quickly as he needs.

"To minimize the movement of empty containers, we are putting a system in place that is strictly information-driven. Rather than manage containers on a terminal or regional basis, we will optimize their efficient use on a global basis. The basic elements are in place, but full deployment won't be until early 1992."

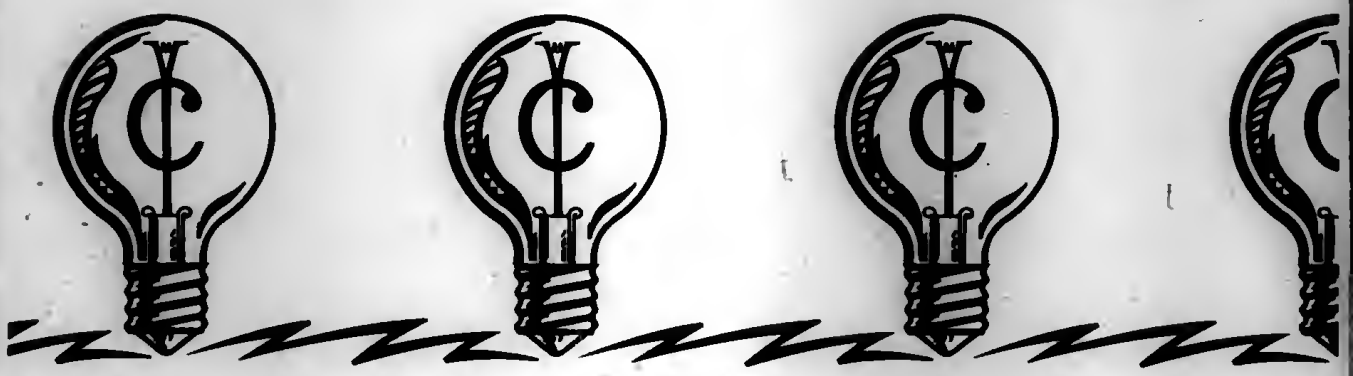
Dial-Up Internetworking. The Most Cost-Effective Connection For Your Enterprise.

Conventional internetworking lets you connect widely-separated workgroups into a single, enterprise-wide network. But only at a very expensive price.

Which is why we believe Dial-Up Internetworking is an idea whose time has come.

Dial-Up Internetworking is the most cost-effective way to extend your enterprise network to the smaller, remote workgroups that comprise the bulk of the internetworking market. It uses the general switched telephone network, limiting the need for the high-performance T-1 lines and high-speed routers that drive up conventional internetworking costs.

Dial-Up Internetworking is made practical by another Telebit® first – a powerful automated dial-up router called NetBlazer. NetBlazer provides low-cost



CALENDAR

Gilbert M. Grosvenor, president and chairman of the National Geographic Society, will be the keynote speaker at the Managing Apple Computers in Information Systems (MACIS) conference June 2-5 at the J. W. Marriott Hotel in Washington, D.C.

Also speaking at MACIS on Apple Computer, Inc. Macintosh integration will be Albert Yepez, acting manager of the IS tools and technology integration group at Apple.

For information or to register, contact MACIS in Chicago, Ill., at (312) 644-6610.

MAY 19-25

Adjusting to Reality: New Profit Strategies of 1991 and Beyond. Palm Springs, Calif., May 19-22 — Contact: Information Industry Association, Washington, D.C. (202) 639-8262.

International Industrial Engineering Conference. Detroit, May 19-22 — Contact: IIE Registrar, Norcross, Ga. (404) 449-0460.

Cause Summer Institute. Boulder, Colo., May 19-23 — Contact: Cause, Boulder, Colo. (303) 449-4430.

Ingres World 1991. San Jose, Calif., May 19-23 — Contact: Ingres, Alameda, Calif. (415) 769-1400.

International DB2 Users Group Conference. San Francisco, May 19-23 — Contact: IDUG headquarters, Chicago, Ill. (312) 644-6610.

Association of Data Communications Users Conference. Atlantic City, May 20-22 — Contact: Augie Biegen, ADCU, New York, N.Y. (612) 881-6803.

Comdex '91. Atlanta, May 20-23 — Contact: The Interface Group, Needham, Mass. (617) 449-6600.

Windows World '91. Atlanta, May 20-23 — Contact: The Interface Group, Needham, Mass. (617) 449-6600.

Leadership in a Global Marketplace. Atlanta, May 21-22 — Contact: Sharon Scott, Inforum Institute, Atlanta, Ga. (404) 220-2692.

Systems 3X/400 Expo. Rosemont, Ill., May 21-22 — Contact: National Productions, Salem, Mass. (508) 745-6010.

Unix and Open Systems. Santa Barbara, Calif., May 21-23 — Contact: Deborah Hay, Seybold, Boston, Mass. (617) 742-5200.

Application Development in the '90s Seminar. St. Louis, May 22 — Contact: Inference Corp., Los Angeles, Calif. (213) 322-0200.

Managing Information Technology in Turbulent Times. Wellesley, Mass., May 22 — Contact: CIMS, Babson College, Wellesley, Mass. (617) 239-4531.

Computer Interoperability and Quality: Networking Challenges for Manufacturing. Arlington, Va., May 22-23 — Contact: Ruth J. Bagnall, Society of Manufacturing Engineers, Dearborn, Mich. (313) 271-1500.

EDI User Group Meeting. Phoenix, May 23-24 — Contact: South West Events, Scottsdale, Ariz. (602) 991-5131.

Copa '91. Montreal, May 23-25 — Contact: Stuart Roosve, Roosve, Gerb and Associates, Toronto, Ontario (416) 482-9888.

World Computer Law Conference. Chicago, May 23-25 — Contact: Michael D. Scott, Center for Computer/Law, Manhattan Beach, Calif. (213) 689-5186.

MAY 26-JUNE 1

Database World Conference and Exposition. Washington, D.C., May 28-30 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Client Server '91. St. Louis, May 28-31 — Contact: Boston Sem, Washington University, St. Louis, Mo. (314) 889-5380.

SCAT/ASIT '91. Washington, D.C., May 28-31 — Contact: Gil Merrit, The Information Exchange, Woodbridge, Va. (703) 490-3300.

DB2 Productivity Tool Seminar. New York, May 29 — Contact: DB2 and SQL Users, New York, N.Y. (212) 866-7563.

JUNE 2-8

Interactive Systems Corporation Developers' Conference. Universal City, Calif., June 2-5 — Contact: Interactive Systems Corp., Santa Monica, Calif. (213) 453-8649.

3Wizard Spring Conference. Santa Clara, Calif., June 2-5 — Contact: 3Com, Santa Clara, Calif. (415) 732-5069.

International Communications Association Conference and Exposition. Anaheim, Calif., June 2-7 — Contact: ICA, Dallas, Texas (214) 233-3889.

National Prime Users Group Conference. San Antonio, June 2-7 — Contact: NPUG, Laurel, Md. (303) 490-2056.

Computer Graphics for Design. New York, June 3-5 — Contact: The Center for Computer Graphics for Design, Briarcliff Manor, N.Y. (914) 741-2850.

Macbuild '91. Los Angeles, June 3-5 — Contact: Robert Berkowitz, Practice Management Associates, Newton, Mass. (617) 965-0055.

The IRM Imperative. Arlington, Va., June 3-5 — Contact: Barnett Data Systems, Rockville, Md. (301) 762-1288.

Xplor International European Conference. Veldhoven, Netherlands, June 3-5 — Contact: Xplor International, Palos Verdes Estates, Calif. (213) 669-7567.

Xhibition '91. San Jose, Calif., June 3-6 — Contact: Integrated Computer Solutions, Inc., Cambridge, Mass. (617) 547-0516.

Mumps Users' Group Meeting. New Orleans, June 3-7 — Contact: Mumps Users' Group, College Park, Md. (301) 779-6555.

Object World Conference. San Francisco, June 3-7 — Contact: World Expo Corp., Framingham, Mass. (508) 879-6700.

Digital World Conference. Beverly Hills, Calif., June 4-6 — Contact: Seybold Seminars, Malibu, Calif. (213) 457-5850.

Downsizing Corporate Computing. Chicago, June 4-6 — Contact: Bob Daniel and Todd Langton, Boston University Corporate Education Center, Tyngsboro, Mass. (508) 649-9731.

Inventory Management Expo and Conference. Rosemont, Ill., June 4-6 — Contact: Kotch and Polak, Inc., New York, N.Y. (212) 557-6850.

Managing Office Ergonomics: Toward a National Consensus. Tysons Corner, Va., June 5-6 — Contact: The Center for Office Technology Conference, Washington, D.C. (202) 466-7810.

Interactive Multimedia: An Approach to Education. Dallas, June 7 — Contact: Informart, Dallas, Texas (214) 746-3500.

Lotusworld '91. Boston, June 7-8 — Contact: Susan Hines, Daniels & O'Keefe Associates, Sudbury, Mass. (508) 443-3330.

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Software Publishers Association European Conference. Cannes, France, June 9-12 — Contact: Software Publishers Association, Washington, D.C. (202) 452-1600.

American Bankers Association's Corporate Trust Workshop. Reston, Va., June 9-13 — Contact: Lisa Coe, ABA, Washington, D.C. (202) 663-5000.

The Security Impact of Networks, Telecommunications and Office Automation. Denver, June 10-12 — Contact: Computer Security Institute, San Francisco, Calif. (415) 905-2626.

Usenix Summer 1991 Technical Conference and Exhibition. Nashville, June 10-14 — Contact: Usenix Conference Office, El Toro, Calif. (714) 588-8649

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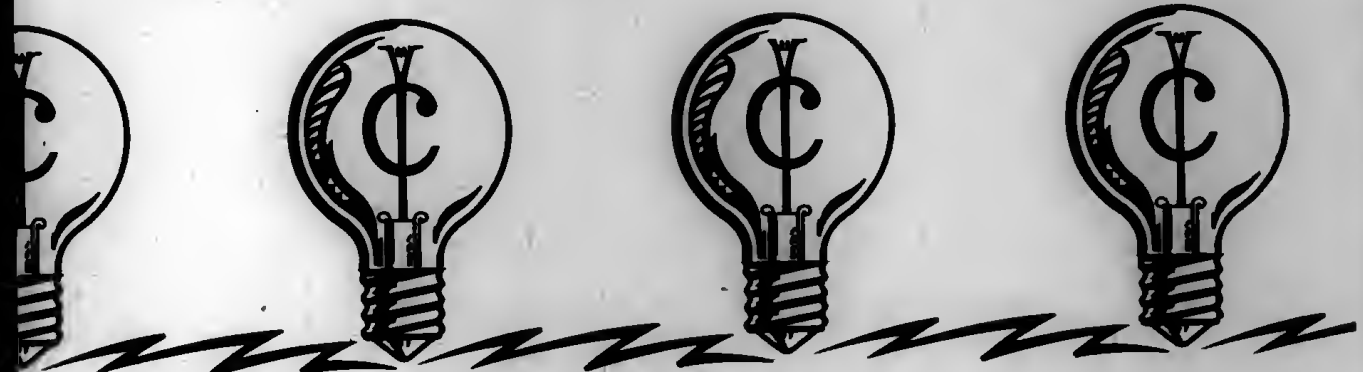

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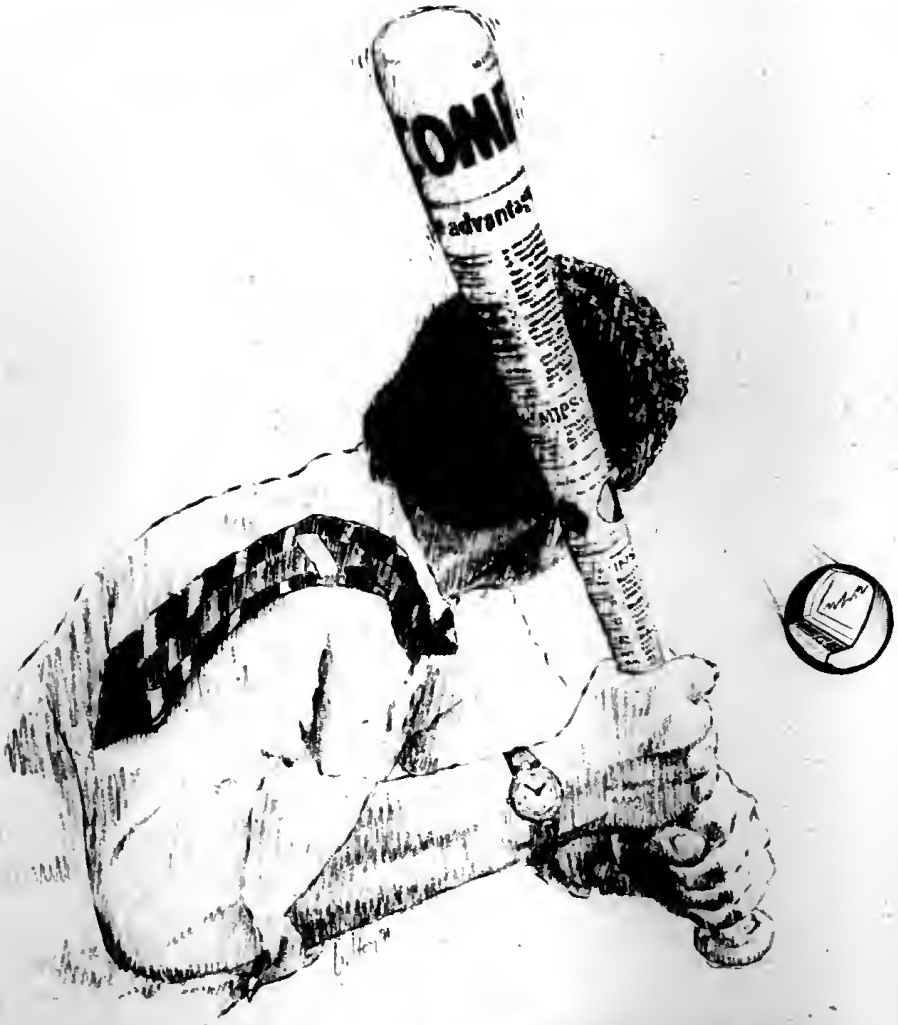

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It's reality time

The romance between corporate America and computers shows signs of maturing and settling down to everyday life

Thermo Electron's Hatsopoulos: *"Is it worth the money?"*

BY JOSEPH MAGLITTA

As the heady technology days of the late 1980s fade into the sober 1990s, the honeymoon glow surrounding corporate executives and information technology has sharpened into the harsh glare of everyday life.

Gee-whiz attitudes and the blind pursuit of competitive advantage have matured into clear-eyed realism. The new focus is targeted, functional and cost-justified. Chalk it up to experience.

"The expectations that we may have had four or five years ago were well beyond the scope of what a good system could do — let alone what the average system could do," acknowledges Steve Berlin, chief financial officer at Citgo Petroleum Corp. in Tulsa, Okla. Today, Berlin says, experience has better taught companies about what information systems can and cannot do. "We don't have the expectation now that a new computer system is the be-all and end-all that's going to solve all the world's problems. We have gotten much more realistic."

Realistic. The word crops up frequently when Fortune 1,000 executives are discussing computers. In fact, more realistic expectations of information technology highlight a new *Computerworld*/Andersen Consulting survey of 200 top U.S. executives.

Corporate heads say information technology remains a critical — and growing — part of their businesses. But compared with the most recent *Computerworld* executive survey two years ago, there is a much stronger feeling now that IS is less of a competitive magic bullet than a necessary (and often costly) ante for business survival.

"All of our manufacturing operations, all of our financial applications are really locked into computer applications," says Robert J. Myers, president and chief operating officer at Grumman Corp. in Bethpage, N.Y. "If we lost the use of our computers, it wouldn't be long before we'd really be in deep trouble."

James Klopman, a vice president who heads merchandising operations at Russell Athletic, a division of Russell Corp. in Alexander City, Ala., adds: "In the apparel business, there's less and less product differentiation. We have to think in terms of service, and that has to do with information flow."

It's too early to tell if the results represent a major shift in mind-sets or just a short-term detour. At the very least, the survey responses reveal the beginning of an important corporate reassessment of how information technology is used.

Blind faith no more

It was only a short while ago that chief executive officers — excited by articles in the *Harvard Business Review* and other magazines that touted successes at American Airlines, Inc., Baxter Healthcare Corp. and a precious few others — naively raced ahead in the belief that heavy investments in computers would automatically translate into big market gains.

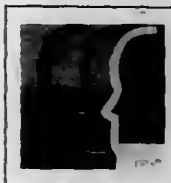
> THERE IS A MUCH STRONGER FEELING now that IS is less of a competitive magic bullet than a necessary (and often costly) ante for business survival.

Unfortunately, in most cases, big IS spending did not equal greater market share, and many executives came away disappointed, notes N. Dean Meyer, principal at N. Dean Meyer and Associates, Inc., a Ridgefield, Conn., consultancy specializing in information technology use.

"Everybody was looking for the grand slam — the single large system that had a dramatic impact on the competitive advantage and the success of the firm," Meyer says. "The problem is that grand slams in real life are hard to find."

Even in smaller projects, says Barbara Herman, vice president at Cambridge, Mass.-based Index Group, Inc., business results often failed to meet expectations. "Companies may have been able to

Continued on page 82



How top executives evaluate IS

Key points

▶The belief that information technology can be used for competitive advantage is less prevalent than it was two years ago.

▶The role of information technology is increasing in most Fortune 1,000 organizations.

▶Many executives say they have a more realistic attitude about what IS can and can't accomplish.

▶Most executives, especially CEOs, say IS is changing business processes such as manufacturing and distribution.

▶Despite lower expectations, more executives say they are getting their money's worth from IS investments. Measurement programs are popular, but they differ widely (see story page 83).

▶Personal computer use by executives is increasing (see story page 92).

▶The chances of IS managers reaching the CEO suite are considered very low (see story page 88).

▶Alex J. Mandl, chairman and CEO at Sea-Land Service, Inc., says top business executives must continue to press for smart technology use (see story page 67).

Continued from page 81

implement 'the laptop pilot' but still don't have better sales productivity or higher sales," she says. "There's a certain amount of disillusionment."

As a result, many cost-pressured executives are now taking another, harder look at how and where technology is deployed.

George Hatsopoulos, CEO and president of Thermo Electron Corp., a leading manufacturer of environmental controls in Waltham, Mass., says: "When MIS expands too much, I call all the managers in and say 'Do you really want all that information? Is it worth the money?' "

Scrutiny of IS projects has also increased at The Southern Co. in Atlanta, according to Larry Westbrook, vice president of finance. "I think we're doing a lot tougher job assessing the costs and benefits. Not just, 'It is nice to fix it,' but 'What do we get?' "

Far from giving up

Even though competitive expectations have diminished somewhat, U.S. corporations are far from willing to give up on IS. Nearly 94% of survey respondents agreed that IS should have a "significant impact" on the bottom line of their organization. Similarly, 87% agreed that "information technology is an integral part of our business strategies."

While both figures are down slightly from the 1989 survey, they nonetheless show the vital role information technology is expected to play in the overall company mission.

However, the focus for many has now shifted to improving internal quality and efficiency, which they hope will indirectly benefit overall corporate performance. Hatsopoulos declares: "If you manage your company well, you become competitive" — a view shared by many respondents.

In many organizations, the rush to automate has been replaced by a more careful, systematic examination that emphasizes the use of information technology to rethink individual business processes.

Indeed, "re-engineering" is fast becoming the next corporate computing fad. Some 86% of the executives polled this year agreed that "information technology is reshaping many of our business processes."

> IN MANY ORGANIZATIONS, the rush to automate has been replaced by a more careful, systematic examination that emphasizes the use of information technology to rethink individual business processes.

For example, retail bank National City Corp. in Cleveland — like many businesses — is seriously looking at ways to redo its processing by using imaging technology, says Harold Todd, executive vice president and COO.

Titan PRT Systems, Inc. in Park Ridge, N.J., which manufactures transportation systems, now uses computers to help its mechanical engineers do quick designs of superstructures. This simple process redesign has greatly improved speed and cut costs, according to Bob Liebmann, finance vice president.

Many reasons for shift

Another sign of the cooling romance between corporate executives and IS is a drop in the percentage of executives who say they are "personally paying more attention to information technologies than they did a few years ago." In 1989, 84% of respondents agreed with that statement; in 1991, the figure fell to 79%.

According to consultants and academics, the reasons for the changing attitudes toward technology are twofold: First, computers could never meet the impossibly high goals envisioned by many starry-eyed CEOs. Second, bad real-life experiences — including stalled, ineffective or long-delayed technology — gave many corporate officers a merciless education about what IS could and could not do.

"You expect EDI and . . . bar coding to come to the forefront, and it's slower getting here than we want it to be," explains Richard III, president of The Triumph Group, Inc., an Alco Standard Corp. subsidiary in Valley Forge, Pa. Expectations are also lowered, he adds, "because of the difficulty and cost of some of the [computer] projects."

Another big factor, executives and consultants say, is the heavy computerization of most industries today. While early technology pioneers got a jump on their competitors, such advantages quickly evaporate when everyone else gets the same technology. Today, industry analysts agree that a company is lucky to get a six-month advantage from IS. "I can't think of any system we don't have that our competitors do," says Edward Schenk, president of Gwaltney of Smithfield, Inc., a Smithfield, Va.-based subsidiary of Smithfield Foods, Inc.

N. Venkatraman, a professor at MIT's Sloan School of Management and an industry consultant, blames vendors and consultants for the "overblown expectations" and "mistaken call" of information technology in the late 1980s. "CEOs got mistaken expectations that you invest in information technology and the next quarter you get results. Forget it," Venkatraman said.

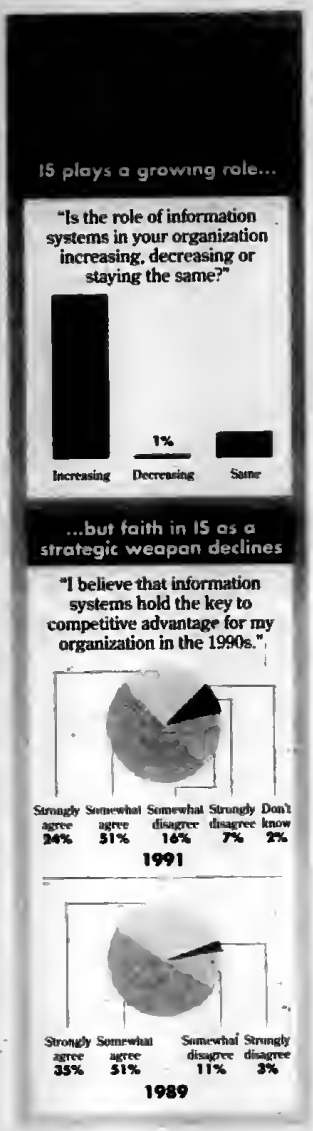
Spending holds steady

Despite lower hopes, executives feel strongly enough about the power of information technology to either hold level or modestly increase IS spending despite recessionary pressures.

While 82% of the respondents said current economic conditions are affecting their business, only 26% have reduced their spending on hardware, software or communications. Staff reductions and delayed capital investments were the favored cost-cutting measures. Many respondents refuse to trim, however.

"[Management guru] Tom Peters . . . says there are three things you definitely don't do in a recession," Klopman says. "You don't cut back on training, you don't cut back on advertising, and you don't cut back on information services. You increase your expenditures there."

To help ensure that they are getting the biggest "bang per buck" from IS, many corporations are employing a wide variety of measurement systems, ranging


IS plays a growing role...
"Is the role of information systems in your organization increasing, decreasing or staying the same?"
1%
Increasing
Decreasing
Same
...but faith in IS as a strategic weapon declines
"I believe that information systems hold the key to competitive advantage for my organization in the 1990s."
Strongly agree 24%
Somewhat agree 51%
Somewhat disagree 16%
Strongly disagree 7%
Don't know 2%
1991
Strongly agree 35%
Somewhat agree 51%
Somewhat disagree 11%
Strongly disagree 3%
1989

IS: Different things to different industries

While executives from different industries agree on many major points about the use of information technology, big differences do exist.

In general, companies involved with energy exploration, natural resources and chemicals had the lowest expectations — and least satisfaction — when dealing with IS. Service companies and finance/insurance firms voiced the highest levels of satisfaction and hope. Following is a brief summary of broadly grouped industry responses in key areas:

Using IS for competitive advantage: Finance/insurance companies were the strongest believers (3.24 of 4 points); exploration/energy/natural resources/chemical were the weakest (2.78). Mean for category: 2.95.

Getting money's worth from IS: Exploration/energy/natural resources/chemical firms were the most satisfied; service industries were the least satisfied.

IS meeting expectations: Exploration/energy/natural resources/chemical firms (29.2%) were most likely to say IS was "fully meeting" expectations; manufacturing companies were least likely (16.7%). Average for category: 20.1%.

Bottom-line impact of IS: Service companies strongly expected the biggest contribution to the bottom line (68%); exploration/energy/natural resources/chemical firms expected the least (29.2%). Average for category: 54%.

Reshaping business processes with IS: Manufacturing firms expected the most change (3.33); exploration/energy/natural resources/chemical companies expected the least (2.96). Mean for category: 3.25.

Reductions in IS spending: Exploration/energy/natural resources/chemical firms reported making the most changes or reductions, followed by service and finance/insurance. Delaying or deferring capital investments was the most common cost-cutting measure.

Measuring IS benefits: Service companies believed it most possible (84%); exploration/energy/natural resources/chemical companies believed it least possible (50%). Average for category: 72.5%.

Outsourcing: Finance/insurance (39.5%) firms were most likely to outsource all or part of their IS operations; service companies were the least likely (29.2%). Average for category: 34.6%.

Rating IS management: Manufacturing firms were most likely to rate their IS management as "very adequate" (43.3%); exploration/energy/natural resources/chemical firms were least likely (29.2%). Average for category: 40%.

Background in IS: Executives in finance/insurance were most likely to have an IS background (15.8%); exploration/energy/natural resources/chemical executives were least likely (8.3%). Average for category: 13%.

Emerging technologies: Manufacturing was most interested in electronic data interchange (EDI) (30%); finance/insurance in imaging/bar coding (56.5%); service in EDI (60%); and exploration/energy/natural resources equally in networking, voice technology/artificial intelligence, distributed data processing and software development (25% each).

Of the 200 executives surveyed, finance made up 12.5%; transportation, 2.5%; exploration/resources/chemical, 12%; engineering, 1%; manufacturing, 48.5%; utilities, 4%; sales (retail/wholesale), 7%; service, 4.5%; insurance, 6.5%; other, 1.5%.

JOSEPH MAGLITTA

from formal examinations of IS-generated profit and customer complaints to informal, subjective assessments (see story below). Still, acknowledges one CEO: "It's mostly a gut-feel kind of a thing."

Despite its current stigma as a last resort or admission of failure, outsourcing is becoming a more popular cost-cutting tactic. More than one-third of executives said they are currently outsourcing all or part of their IS operations. Another 8% are considering doing so.

That so many companies would even consider handing over a function as critical as information processing — unthinkable a few years ago — is a sure sign of the depth of the current rethinking of information technology.

Room for improvement

Are companies getting their money's worth from information technology? That, of course, is the $64,000 question.

Surprisingly, corporate heads expressed slightly greater satisfaction with the performance of their corporate IS departments in 1991 than they did two years ago. For example, the number of respondents who said they are getting their money's worth from IS spending actually increased since the last survey, from 35% to 46%.

Analysts attribute this apparent paradox to a growing understanding of IS on the part of corporate executives. "In many cases, executives have had much more frequent interaction with IS," and thus, they have a more realistic view, Herman says.

The majority said their companies do a fair job linking business strategy and IS, though there is room for improvement. Of the sample, 37% said the two are "very closely linked," 53% said they are "somewhat linked," 8.5% said they are "not very linked," and 1.5% claimed they are "not linked at all."

Such ratings, however, are relative. Nearly 50% of all organizations said they don't feel technology investments are yielding adequate returns. Antiquated systems, poor implementation and an increase in volume of paper and information, to name a few, have all dampened executives' enthusiasm about information technology.

Obviously, Meyer says, that represents a major problem and challenge for many large U.S. businesses. The solution, he says, "is not a few grand slams but an avalanche of strategic systems" based on new methodologies and better needs assessment.

High hopes

Even though many executives now appear to be taking a more tempered attitude toward information technology, hope about the future remains high.

There is fairly strong agreement (70%) among non-IS executives that computers will continue to shape how their corporations do business. Most executives, especially CFOs, continue to worry about corporate data security. But electronic data interchange (EDI), bar coding and imaging, voice technology and networking continue to draw high interest.

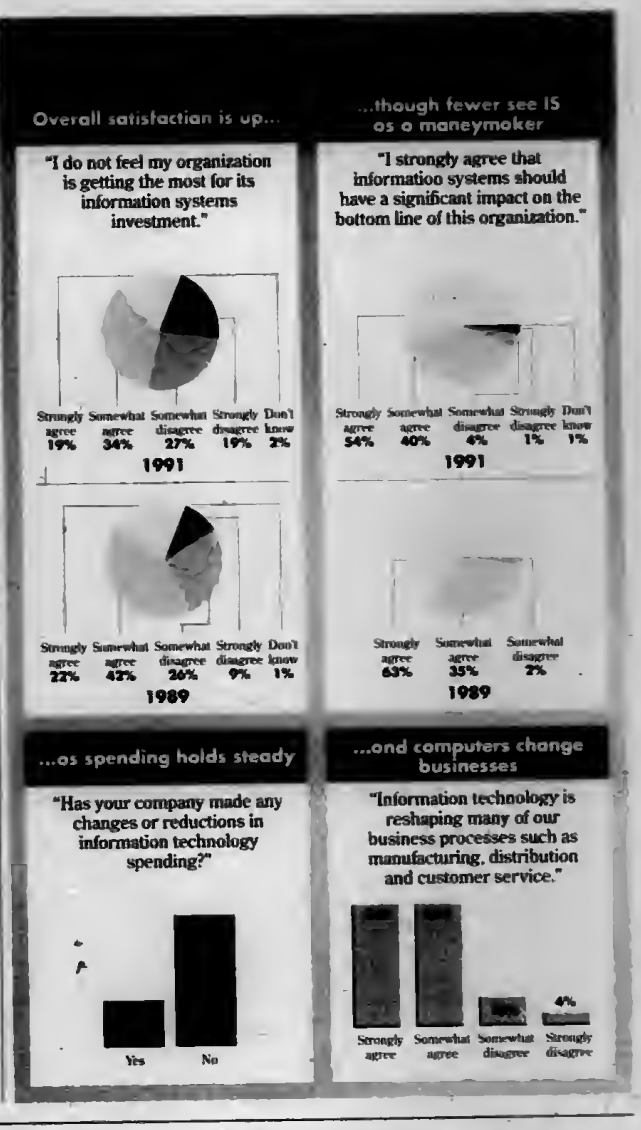
Yet it is important to note that many are far from willing to proclaim the death of information technology as a competitive weapon. Among them is Harvard Business School Professor F. Warren McFarlan, who blames the dip in the belief of IS as a competitive tool at least in part on the current recession. McFarlan, arguably the world's leading authority on the business use of IS, predicts attitudes will change when CEOs find themselves under less severe short-term financial pressures.

Others are more cautious. "Trying to find that elusive competitive advantage through information technology is going to be far more elusive than we ever anticipated," concludes William Welsh, president and CEO at Valmont Industries, Inc. in Valley, Neb.

So while information technology may no longer have the raw sex appeal for everybody that it did in the late 1980s, there's little doubt that corporate executives are very willing to settle down and work on a nice, long-term relationship. •

Susan Nykamp and Kim S. Nash contributed to this report.

Maglitta is a *Computerworld* senior editor, executive report/integration strategies.


Overall satisfaction is up...
"I do not feel my organization is getting the most for its information systems investment."
Strongly agree 19%
Somewhat agree 34%
Somewhat disagree 27%
Strongly disagree 19%
Don't know 2%
1991
Strongly agree 22%
Somewhat agree 42%
Somewhat disagree 26%
Strongly disagree 9%
Don't know 1%
1989
...though fewer see IS as a moneymaker
"I strongly agree that information systems should have a significant impact on the bottom line of this organization."
Strongly agree 54%
Somewhat agree 40%
Somewhat disagree 4%
Strongly disagree 1%
Don't know 1%
1991
Strongly agree 63%
Somewhat agree 35%
Somewhat disagree 2%
1989
...as spending holds steady
"Has your company made any changes or reductions in information technology spending?"
Yes
No
...and computers change businesses
"Information technology is reshaping many of our business processes such as manufacturing, distribution and customer service."
4%
Strongly agree
Somewhat agree
Somewhat disagree
Strongly disagree

IS dilemma: How to measure your return on investment

"If you can't measure it, you can't improve it." So goes a quality axiom popular in many large corporations today. In few places is the metric dictum being taken as seriously as in the area of information systems. Unfortunately, many corporations are discovering that it is easier to search than to find.

"The question that everyone is asking themselves is: Are we getting the value for [our IS] investment? Nobody can really tell us," says William Welsh, president and chief executive officer at Valmont Industries, Inc., a manufacturer in Valley, Neb.

The answer to the IS metric question is, of course, vitally import to business executives and IS managers alike. For business managers, solid information about technology's return on investment can provide much-needed ammunition to justify massive, profit-gobbling IS expenditures to shareholders. For IS departments, it is a way to justify their very existence.

John Elkins, president and CEO at the Naisbitt Group, an Evergreen, Colo., consultancy, says many organizations are stuck on an IS spending treadmill.

"It's sort of like a drug they can't get off of," Elkins says. Measurement can help companies decide to increase or decrease IS outlays, he says.

While overall satisfaction with IS is up from two years ago, many corporations are nervously casting about for measurable proof to back up their feelings.

Some 72.5% of executives polled said they believe "the values and benefits of information systems and technology are measurable and quantifiable." They also quickly admit, however, that determining exactly how and what to measure is no easy task.

"We don't even try," says Steve Berlin, chief financial officer at Citgo Petroleum Corp. in Tulsa, Okla. "If you see people walking around talking about 'we have this kind of back order, and this customer has historically taken this, and now we see a change in his pattern,' we know that the systems are working."

Actually, the measurement question breaks down into two important areas: measuring IS performance and measuring its impact on the bottom line.

Companies take wildly different approaches in their attempts to measure the two areas. Companies tend to fall into two schools: measurers and "gut-feelers."

Among measurers, several measures are popular: sales and profit margins, operating cost savings, staff reductions, inventory levels, overall unit productivity and specifics such as defects per unit and time per unit on projects.

However, most concede that such industrially oriented measurements do not readily account for "soft" benefits, such as improved customer satisfaction, that are among the most important benefits of information technology.

Wide-reaching outlook

Thus, a careful look at the bigger picture is also important.

"Cost is only half the story," says Harold Todd, executive vice president and chief operating officer at National City Corp. in Cleveland. "The other half is, how well are we meeting the business needs of our corporation, and how well are we supporting the rest of the corporation and doing what they want to do?"

As efforts to establish meaningful metrics continue, some executives wonder if they will ever discover the magic formula.

"I'm not sure we're ever going to get to a point where we can unequivocally say that what we're spending on information technology is the right amount," Welsh says, "or if what we're spending on information technology is generating value for our shareholders over and above what we would have gotten had we not had it. I don't think we'll ever get there."

JOSEPH MAGLITTA

How can you make your boss happy?

Take a lesson from Superman: Learn how to be everything to everybody — and do it fast

How does Edward Schenk, president of a Smithfield Foods, Inc. subsidiary, describe his ideal chief information officer?

"Leaps tall buildings with a single bound," laughs Schenk, who heads Gwaltney of Smithfield, Inc. in Smithfield, Va.

He's only half joking.

Increasingly, general business managers say they are looking for a CIO who has the technical brilliance of Charles Babbage, the business savvy of Bill Gates, the vision of Thomas Jefferson and the leadership abilities of Gen. H. Norman Schwarzkopf.

The ideal CIO must be both "a technocrat and a businesscrat at the same time," says Jerre Stead, chief executive officer at Square D Co., an electronics manufacturer in Palatine, Ill. Not only that, the ideal CIO can't be a prima donna who pursues whatever project captures his fancy. Instead, says Schenk, "the CIO's goals have to be consistent with corporate goals and objectives."

At the same time, CIOs also need the guts to sponsor unpopular technology initiatives when appropriate, according to Harold Todd, executive vice president and chief operating officer at National City Corp. in Cleveland.

"CIOs must have the energy that allows them to take their vision of how technology can be applied to a particular situation and get it properly shaped," Todd says.

And if that's not enough, Fortune 1,000 executives add, it goes without saying that these key systems and services must be delivered quickly, on time and within budget.

If all that sounds pretty daunting, it is. But executives say that's the price information systems people must pay if they want to be considered hotshot players in the business and not spend the rest of their days exiled to a chilly machine room somewhere.

Here are the skills and attributes top business executives say are most critical for IS managers:

- Broad perspective/understanding of the business: 32%.
- Technical ability/skills/knowledge of current technologies: 30%.
- Understanding of how IS can improve the business process/vision: 18.7%.
- Interpersonal/people managing skills: 15.5%.
- Communication skills/being a good listener: 14.5%.

Interestingly, honesty was mentioned often by CEOs as an especially desirable attribute, as was good project management skills.

Improving performance

How can IS managers perform even better? Executives made the following suggestions:

"Better focus." "Be more responsive to change." "Enhancement rather than improvement." "More information online and fewer reports." "Do a better job on efficiencies and productivity." "Understand the benefits of IS better."

"Adaptability — to figure out what needs to be done and do it, not come up with excuses about why it can't be done." "People skills." "Streamlining information of a common format." "More reporting, less cost." "Getting end users involved more." "Better integrate IS with total quality management system."

"Better return on investment." "More expertise in the micro area." "More cohesiveness as a department." "Identify and focus on priorities." "Persistence." "Communications — to be able to articulate and define problems and strategies."

JOSEPH MAGLITTA

Things they hate

Formula for IS career suicide: Take a little more time developing applications. Rely on your gut feeling about what's best. Let tomorrow take care of itself. Go the extra mile in spending if it's needed, and always swing for home runs.

Here's a quick rundown of what business executives hate most about IS. They say IS:

- Doesn't anticipate future needs.
- Isn't customer service-oriented enough.
- Takes too long to develop software.
- Isn't flexible enough in adapting mainframe to division's needs.
- Has slow turnaround.
- Is too bureaucratic.
- Needs more expertise in the microcomputer area.
- Lacks departmental cohesion.
- Has poor linkage to strategic planning.
- Has high operation costs.

JOSEPH MAGLITTA

Swallow hard before pitching that IS proposal to the CFO

You've got a hot technology proposal. You're likely to get the most resistance from (a) the CEO, (b) the COO or (c) the CFO?

The answer, in most cases, will be C.

In general, CEOs tended to have the most liberal attitudes toward information systems, and CFOs had the least. The differences between executive attitudes on many issues was pretty small, however.

Predictably, CFOs were toughest on money matters, and COOs were toughest on issues of implementation and operation.

"CFOs are closer to [IS] and more realistic," says Larry Westbrook, vice president of finance at The Southern Co. in Atlanta. "We also tend to measure things in dollars and cents, so perhaps we're more cautious."

Bill Huff, CFO at Affiliated Publications, Inc. in Boston, agrees: "I think that a lot of things that IS does cannot really be cost-justified from a CFO's point of view." But, he notes, "because it's the 'latest thing' in the world of technology, it has to be done."

CFOs were far less likely to believe that their company's IS operations were closely linked to business strategy (27%), compared with COOs (52%) and CEOs (42%).

Similarly, CFOs less often held the belief that IS should contribute to the corporate bottom line (44% vs. 66% of COOs and 62% of CEOs).

Compared with other executives, CFOs were least confident that spending on information technology was worth the money. Some 21% strongly agreed that their organizations were not getting their money's worth from IS investments. Only 14% of CEOs and 18% of COOs shared that view.

In addition, financial chiefs were also most concerned about corporate data security. Some 51% "strongly agreed" with the statement: "The security of corporate data is a major concern to me personally." This compares with 48% of COOs and 44% of CEOs.

Finally, CFOs also ranked lower in the belief that IS was reshaping business processes (33% vs. 56% of COOs and 50% of CEOs.)

In contrast, COOs were the strongest believers that IS could be used for competitive advantage (32% "strongly" agreed, compared with 21% of CFOs and 24% of CEOs).

Ranking IS managers

IS management received the highest approval ranking from COOs: 52% called IS performance "very adequate," compared with 44% of CEOs and only 32% of CFOs.

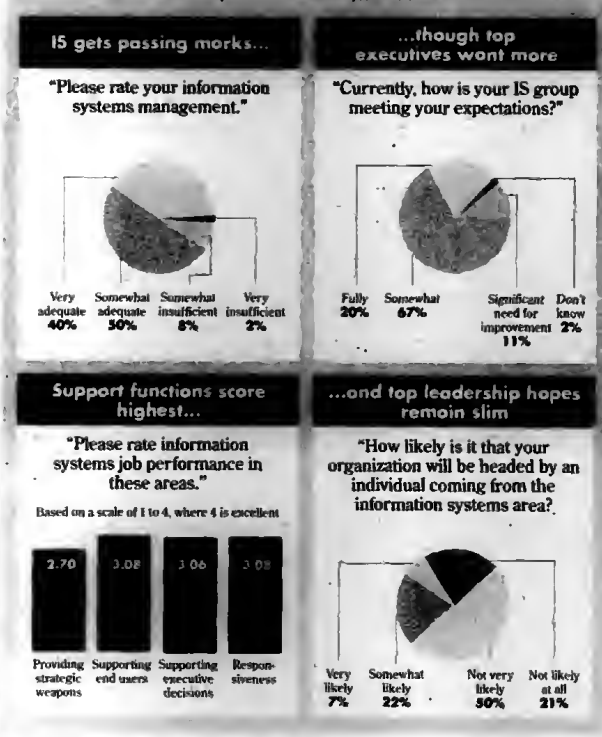
By a wide margin (32%), COOs said IS did a "very good" job supporting executive decisions, vs. 19% of CEOs and 26% of CFOs.

As a group, CEOs were most likely to see IS as "an integral part of our business strategies" (50% vs. 46% of COOs and 37% of CFOs).

CEOs were also least likely to believe that current economic conditions would greatly affect their company's business (22% vs. 40% of COOs and 31% of CFOs).

JOSEPH MAGLITTA

IS departments: OK as supporting actors


IS gets passing marks...
"Please rate your information systems management."
Very adequate 40%
Somewhat adequate 50%
Somewhat insufficient 8%
Very insufficient 2%
...though top executives want more
"Currently, how is your IS group meeting your expectations?"
Fully 20%
Somewhat 67%
Significant need for improvement 11%
Don't know 2%
Support functions score highest...
"Please rate information systems job performance in these areas."
Based on a scale of 1 to 4, where 4 is excellent
2.70
3.08
3.06
3.08
Providing strategic weapons
Supporting end users
Supporting executive decisions
Responsiveness
...and top leadership hopes remain slim
"How likely is it that your organization will be headed by an individual coming from the information systems area?"
Very likely 7%
Somewhat likely 22%
Not very likely 50%
Not likely at all 21%

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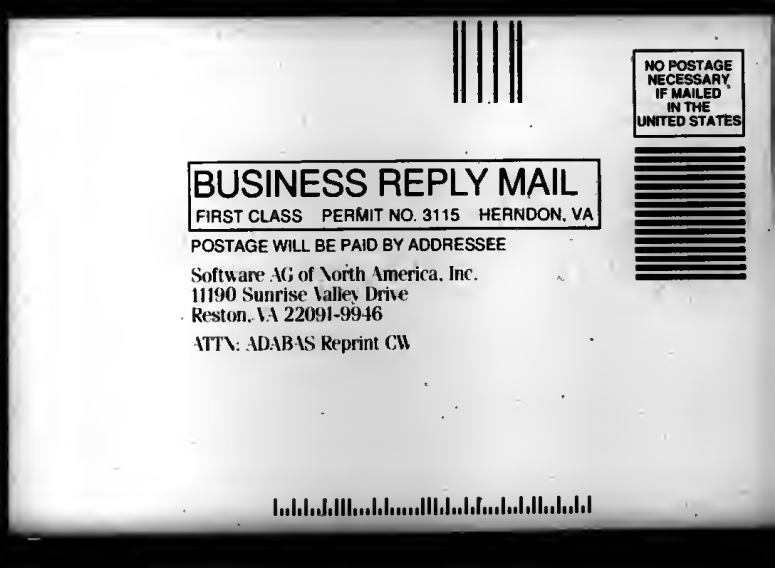
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The people have spoken – loud and clear. On February 25th, *Computerworld* published the results of a survey which named ADABAS from SOFTWARE AG the number one relational database management system – in a field that includes Oracle, Datacom, DB2, and others.

The victory for ADABAS was decisive. In eight out of 15 categories, ADABAS was the top-rated RDBMS, with second-place finishes in five of the other seven areas. And, to quote the *Computerworld* article, "ADABAS users rated their product highest in systems availability and recovery from crashes – by far the most important category for all users surveyed." ADABAS was also top-rated in providing effective programming tools and integration of CASE tools.

In the areas where ADABAS didn't place first or second – support of standard SQL, and useful SQL extensions – major improvements are in the works. ENTIRE SQL Server will be released in 1991, providing full ANSI compliant SQL in the ADABAS nucleus.

Perhaps the most telling survey statistic was the fact that 97.5 percent of ADABAS users said that they'd buy the product again if they were making the decision today. Now *that's* loyalty.

Of course, there were many other topics covered by the survey – more than we can discuss here. So in case you missed it, we'll send you a color reprint of the article absolutely free. Just write to SOFTWARE AG of North America, Inc., ADABAS Reprint, 11190 Sunrise Valley Drive, Reston, VA 22091.

Your success is how we measure ours.

SOFTWARE AG

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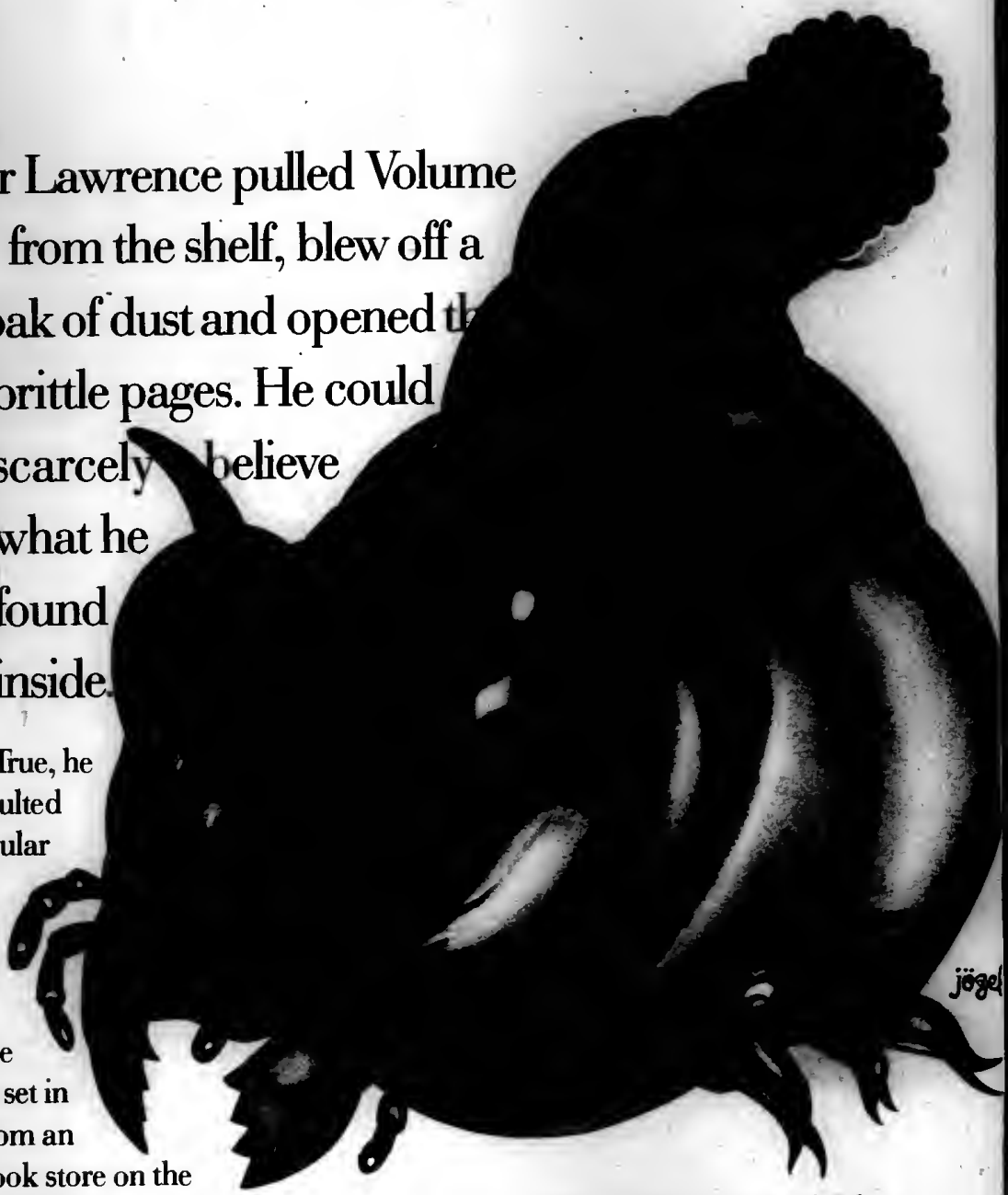
Sir Lawrence pulled Volume IV from the shelf, blew off a cloak of dust and opened the brittle pages. He could scarcely believe what he found inside.



True, he hadn't consulted these particular journals in years and, admittedly, he had acquired the ten-volume set in his youth from an odd little book store on the Thames, but still! Holes!? A bookworm had eaten clean through the pages. Indeed, to Sir Lawrence's considerable chagrin, he found the ravenous little bugger had chewed, in a straight line, from the front cover of Volume I to the back cover of Volume X.

All of which brings us to our seemingly simple question: If each book is exactly two inches thick, how far did the bookworm travel?

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In tussling with this type of cerebral aerobics, most people make a simple but serious error: They *assume* something. Of course, this happens without realizing it. But still, it happens.

As you'll see in a moment, the way to avoid making a false assumption is to work things out methodically. Carefully thinking through each step.

For instance, consider this question. A company makes one of the broadest lines of computer terminals in the world. They have for years. In fact, they've delivered over three million of them.

If you needed terminals you'd probably think of them. But what if you needed PCs? Would you assume that, since this company is so dominant in terminals, they must not do a real number in PCs?

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Of course we realize there's a good chance some of you may have read this far because you're more interested in the answer to our puzzle than in our products. You've *assumed* we'd bury the answer down here somewhere. Well, you're wrong again. At least partially. So go look on page 101.

To learn more about our Decision Series PCs call us. We'll send you complete specs plus a poster of additional Cerebral Aerobics. To help keep your original equipment personal computer in top form. 1-800-GET WYSE.

Now that it's clear we make an impressive line of PCs, you might be tempted to assume we stop there and don't get into the even more sophisticated products like super fast multiprocessing systems for the UNIX environment. With speed in the 100 MIPS range.

But you wouldn't assume that after all this. Would you?

WYSE

You're doing it again. Just because this little type is down here and printed upside down you assumed you'd find the answer this easily. No way. San Jose. Refer back up to the ad and your patience will be rewarded.

Eyeing the CEO suite? Sorry, but . . .

Go ahead, admit it: In your most private moments, you daydream about ascending past CIO heights and becoming . . . dare you say it? . . . CEO.

Forget it. While the chances of IS people making the leap into the executive suite have never been good, executives say they're even worse today.

According to survey respondents, the odds of most career IS people becoming the company's top dog are about as good as IBM rolling out a new generation of proprietary mainframes — in other words, near zilch.

A measly 6.5% of survey respondents said they believed it was "very possible" that the top post in their organization could be assumed by an IS person. That figure was even lower than responses in 1989 (8.9%).

Herb Halbrecht, principal at Halbrecht Associates, an international IS placement agency in Stamford, Conn., agrees with the executives surveyed.

A past president of the Society for Information Management, Halbrecht says many IS people are considered technicians by top management. As a result, there's no chance the vast majority of IS people will ever rise out of their departments, he says.

Despite such assessments, however, there are rays of hope.

Robert J. Myers, chief operating officer and president of Grumman Corp., notes that his most recent job was president of

the corporation's data processing subsidiary. Myers, a financial planner by background, says many IS people lack the crucially needed profit and loss experience.

"But it's possible that somebody coming up in the IS end of the business can develop the same skills as somebody coming up in other elements of the business and have a shot at the job," he says.

"It can happen," agrees Barbara Herman, vice president at Index Group, Inc. in Cambridge, Mass. She points out that Hallmark Cards, Inc.'s CEO and president is a former head of IS.

"If you look at current CEOs, not many come from IS," she concedes. "But if you look at what *could* be, a lot of CIOs are basically businessmen."

JOSEPH MAGLITTA

People and processes

Two hundred top executives from large U.S. corporations participated in the Computerworld/*Andersen Consulting survey. Included were 50 CEOs, 50 COOs and 100 CFOs. Names were selected from* The Directory of Corporate Affiliations, The Corporate 1,000 Yellow Book *and* Hoovers Handbook '91.

Polling took place by telephone and fax between Feb. 8 and March 15, 1991, by First Market Research Corp. in Austin, Texas, and was tabulated and coordinated by the IDG Research Services Group in Natick, Mass.

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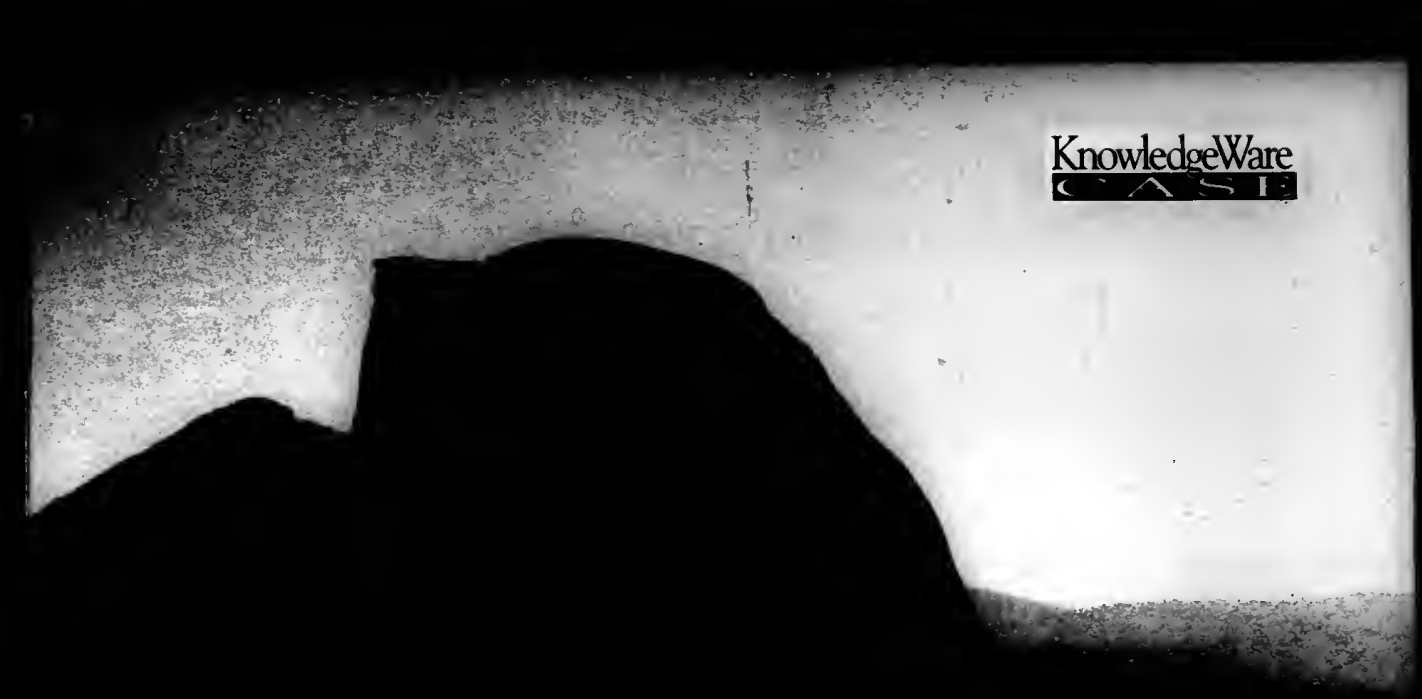

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That tap-tap-tap sound is your boss

Could keyboard phobia be vanishing? Maybe. More nontechnical top executives say they are using computer terminals or personal computers in the normal course of their workweeks.

In the previous *Computerworld* executive survey conducted in 1989, only 44% of the respondents said they regularly used a PC or terminal. This year, the number shot up to 56%.

While executives can't offer any definite explanation for the increase, many say they suspect that heavy use by chief financial officers and younger top bosses is pushing the numbers up.

"I'm younger than many of the executives," notes James Klopman, 38, vice president of merchandising operations at Russell Athletic in Alexander City, Ala. "And I think the younger guys are much more likely not to think it's a big deal."

Predictably, CFOs reported the heaviest use: 59% use PCs or terminals, followed closely by chief operating officers (58%) and chief executive officers (48%). By industry, usage was heaviest in finance/insurance and lightest in service.

Those executives who favor PCs tend to be longtime users. George Hatsopoulos, CEO and president of Thermo Electron Corp., an environmental controls firm in Waltham, Mass., is a good example. A former engineering professor at MIT, Hatsopoulos uses a terminal daily.

Resistance to PC use seems to have dropped down a layer in some organizations. As a result, many pro-PC managers such as Klopman are aggressively encouraging use by senior staff members. Klopman says, "They tell me, 'Oh, I don't have time.' I tell them . . . If I've got the time, you've got the time.' "

Hatsopoulos adds: "I wish more of our executives reporting to me used [a PC] hands-on, but there's a lot of reluctance; there's a lot of fear."

The biggest roadblocks are executives who are unfamiliar with — and possibly afraid of — technology. Other factors are executives who feel they are too busy to learn PC applications or don't know how to type. In many cases, the use of a keyboard is seen as a secretarial task, and executives prefer to rely on others for their information.

"I have [a PC] at home, which I use on occasion," explains Richard Ill, president of The Triumph Group, Inc. in Valley Forge, Pa. "But when I'm at work, it's frankly a lot easier to ask someone else to generate the information."

While the upsurge in executive PC use is encouraging, a certain amount of caution is still in order, warns Mary E. Boone,

Grumman COO Myers: ***Executives must be willing to learn and work hard***

author of *Leadership and The Computer*, which was just published by Prima Publishing and St. Martin's Press.

In her research, Boone says, she discovered that many top executives have PCs on their desks but don't regularly use them. Those who do use PCs use them mostly for simple tasks such as checking stock quotes rather than for leadership tasks, she says.

"While there may be an increase in the number of executives who have computers, I would be surprised if they really understood the connection between the use of the computer and their own leadership objectives," Boone says.

Robert J. Myers, president and COO at Grumman Corp., says executives must be willing to do the learning and hard work needed to make investments in executive support and decision support systems, as well as PCs, pay off.

"If you want to have an information system that's really going to pay off for you, frankly, it's going to require a lot of hard work on the part of the guy that wants to get something out of it," he says.

Executives who have adopted PCs for themselves and their staffs say greater productivity and independence is worth the work of learning the technology and applications.

"It's impressive to see a product manager of women's clothing sit down and write an application for sampling and sample control without any involvement from our MIS department," Klopman says.

JOSEPH MAGLITTA

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Quality-driven software

Bug-riddled, poorly developed software is costing you money — lots of it. Here's how to make quality your team's No. 1 priority

BY RAYMOND FALKNER

Poor software quality is currently costing U.S. companies millions of dollars. This money is being spent on enormous amounts of rework to eliminate bugs and remedy requirement omissions in both existing and newly created systems.

Companies can stop this money drain, however, by establishing a quality culture. By first assessing the magnitude of the software quality problem and then targeting areas for improvement, firms can work to fight this waste.

Organizational-level measures are needed to get a big-picture perspective of how much a company is spending to provide quality software to users. One such method is called Software Cost of Quality (SCOQ).

The concept is simple: SCOQ is the total cost associated with controlling and providing software quality to users. Using a spreadsheet to measure costs in the following broad categories will provide a framework from which to begin the software quality effort:

- **Prevention costs** — the total of costs associated with preventing software defects, education and training, policies and procedures and product redesign before delivery. Each company will have its own unique set of subcategories. For example, a firm's education and training costs might include software-specific information systems management education, language training and so on.
- **Appraisal costs** — the sum of costs associated with measuring, inspecting, testing and auditing for software defects.
- **Failure costs** — the total of costs associated with correcting software system defects (for example, maintenance repairs), computer downtime and additional customer support.

Because some spending will always be required to produce and maintain quality software, the SCOQ will never be zero. Companies should target the SCOQ to be about 5% to 10% of the information technology budget.

Falkner is founder and president of Quality Management Solutions, an Acton, Mass., consulting firm specializing in the quality of information technology software and services.

Jamie Hogan

Research on Japanese and U.S. companies has found that while the Japanese have an SCOQ of about 7% to 10% of the information technology budget, U.S. companies' numbers are 25% to 30%, with many insurance firms as high as 40%. That means tens of millions of dollars are being drained from some companies' bottom lines by poor software quality.

Besides indicating how much it is costing the company to provide quality software, the SCOQ lets IS executives know if resources are concentrated on fixing software problems or preventing them. Unfortunately, studies have shown that most of the money is being spent primarily on correction rather than prevention. In fact, U.S. insurance companies' software quality costs typically break down this way: 7% to 8% are appraisal costs, 2% to 3% are prevention costs, and a whopping 30% are failure costs.

The numbers reflect the severity of the software quality problem, and as most IS managers have discovered, no single structured design or development methodology prevents quality problems from occurring. Not even a change in employee compensation programs has been proven to be sufficient to overcome poor quality. This is because producing quality software is an IS management problem.

Research conducted by W. Edwards Deming and other quality gurus found that only 15% of all manufacturing defects can be traced to individuals. In most cases, individuals are forced to execute poor processes that have product delivery, not quality, as their goal.

It is imperative that management shift the focus from getting things done fast to getting things done right. IS chiefs need to imbue their team with this quality ethic.

For IS managers, that means a three- to five-year software quality improvement plan that targets key management areas: measurements and reports, the software development process, IS organizational setup and software skills and technologies. The plan is a guide to follow during the shift to a quality culture and should result in a 50% reduction in a company's SCOQ.

According to Quality Management Solutions, a software quality consulting firm in Acton, Mass., the most frequent causes of poor software quality are the following:

- **Incorrectly** organized project teams.
- **Improper** use of computer-aided software engineering methods and technologies.
- **Inadequately** trained staff.
- **No** tie between compensation and quality results.
- **Ineffective** management measurement and reporting systems.
- **Outdated** development processes.
- **Inappropriate** levels of user involvement.

Measurement and reports

Software quality — defined as satisfying your customers in various software areas such as performance, reliability, serviceability, conformance and so on — can be measured. Systems-level quality measurements within the information technology organization are essential for real gains to be substantiated and monitored. Software quality measurement begins with a baseline that tells a company where it stands today so it can figure out where it wants to be tomorrow.

A key indicator of quality is customer satisfaction in terms of data accuracy, number of defects, error-free performance and the like. Customer satisfaction can be gauged via a customer satisfaction survey (see chart page 96).

Software defects are typically tracked by systems and reported in terms of

Continued on page 96

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Continued from page 93

systems reliability. Measures include pinpointing defects found within 90 days of delivery and mean time between failure. Productivity can be measured in terms of output, such as source lines of code or function points per effort month.

The results of these measures can be entered into a company database used for statistical analysis and quarterly reporting on trends. These figures can then be compared with internal objectives and the software quality improvement plan.

It is important that IS managers introduce a reporting process that clearly delineates the net causes and effects of software quality and productivity. Each report should be geared to its audience, with business managers knowing how overall software quality has changed and IS staff knowing how a specific system's quality has changed.

Metrics are not cure-alls, however, and they can actually work against quality if not focused properly. One company, for example, wanted to manage its maintenance budget better. It did so by keeping close tabs on programmers' lines of code and the ratio of maintenance and enhancement costs to production costs.

The result was code riddled with blank and extraneous lines (after all, programmers wanted to meet their quotas) and a maintenance nightmare. The two metrics intended to improve productivity and quality actually had the opposite effect because they took into account improvements only at the organizational level and not at the systems level.

If the company had instead measured output using function points and tracked maintenance productivity through the ratio of maintenance requests per full-time (or equivalent) worker, it would have achieved its desired results.

Destination: Quality

Starting on the road to a quality culture? Here are some stops along the way:

- Measure your Software Cost of Quality (SCOQ) to gauge what you've spent to produce and maintain quality software and whether you've spent it on prevention or correction. Remeasure every six to 12 months.
- Establish a baseline from which to work and improve.
- Institute a three- to five-year quality improvement plan that implements a systems-level measurement program, improves reports to management and IS staff, reorganizes project and departmental resources, introduces technologies to bolster IS skills and revamps development processes.
- Set a goal — typically a 50% reduction in the SCOQ.

Development process

A change in the software development process can further the creation of a quality culture. The existing software development process used by 95% of all Fortune 1,000 companies consists of a structured process that dates back to the early 1970s. These processes are phase-driven and move sequentially from the requirements phase through design, construction, testing and implementation. Their advantage is project control; their disadvantage is a lack of customer satisfaction with software quality.

In the 1990s, the greatest change in software development (and quality) will occur as companies move from a software "product" orientation to a software "service" orientation.

Product-oriented software development works on the principle of unwavering requirements and the movement of software from one phase of development to another, obtaining all the appropriate sign-offs but with little user input.

Customers are involved only in requirements (within strict limits), and quality is judged by the correction of all previously identified defects as well as the ability of the development team to deliver the product as quickly as possible.

Service orientation has the customer as the driving force. Software development consists of multiple parallel activities, with requirements evolving from general to detailed. Customers are involved throughout the process and serve as the final determinants of whether the job is complete. Service-oriented software development has quality as its driving force.

Organizational setup

Improving software quality will rely heavily on the people who construct software systems and not on machines. Computer-aided software engineering tools and automated aids help people in the process, but the correct organization and use of people determines the quality of the resulting product or service.

Companies have used a variety of organizational setups to determine and track software quality, but most have not worked. Quality assurance organizations, for instance, have had trouble in the past because they were deemed "inspectors" whose mission it was to uncover problems created by others.

Software maintenance staff members are often considered second-rate programmers or analysts charged with pacifying users and fixing problems created by developers. Developers are viewed as creative generalists who design, build, redesign and rebuild to keep meeting floating requirements. This has led to poor quality, but enriching the work people do and not perpetuating stereotypes can turn this around.

A study conducted at a major communications company revealed that systems maintainers were surprisingly happier and more appreciated than any other information technology group in the company. Programmers, analysts and IS managers struggled to get themselves out of development and data centers and into maintenance. Why? Maintenance staffers didn't just work with code; they had close customer contact and were able to establish and manage schedules and satisfy their customers. They wanted to produce quality work and were allowed to do so. Interestingly, this company also spent less on maintenance and enhancements than the industry average, in spite of the poor quality of its development work.

Software skills and technologies

A quality culture relies on people who have the right quality orientation and the necessary skills and tools to create quality software. The trend toward new technologies has been slow to take hold in companies because of the retraining needed and resistance to change. However, new technologies must continue to be introduced to change the way systems are developed. New technologies allow active managers opportunity to enrich the IS "quality of work" environment and produce higher quality results.

The starting point has to lie in the retraining of managers, instilling in them a software quality ethic. Recognizing, communicating, rewarding and encouraging a quality ethic must be at the heart of every information technology organization. Most IS people want to produce quality work; managers must give them the means (skills and technology) and feedback (coaching) to do so.

Quality improvement requires a rethinking and revamping of human and technical processes. With millions of dollars — as well as the company's image as a quality provider of products or services — at stake, IS managers must personally lead the charge. After all, isn't that what quality leadership is all about? •

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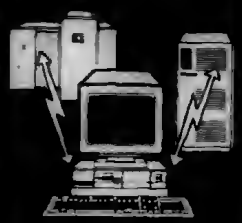

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Is your software satisfying users?

A key indicator of quality is customer satisfaction. The following is a prototype of a customer satisfaction survey

USER SATISFACTION SURVEY

From the business user's perspective, please rate the following criteria in terms of satisfaction and importance. Use the following scale to answer each question:

SATISFACTION	IMPORTANCE
5 - Completely satisfied	5 - Extremely important
4 - Very satisfied	4 - Very important
3 - Neither satisfied nor dissatisfied	3 - Somewhat important
2 - Mildly dissatisfied	2 - Of minor importance
1 - Strongly dissatisfied	1 - Not important

	SATISFACTION (answer 1-5)	IMPORTANCE (answer 1-5)
1. PERFORMANCE		
• Data accuracy		
• Accessibility to current data		
• Accessibility to historic data		
• Timeliness of system response		
• Completeness of system		
2. FEATURES		
• Flexibility for future modification		
• Ability to query data by request		
• Information summary capabilities		
• Security capabilities		
3. RELIABILITY		
• Consistency of response time		
• Extent to which system performs without error		
• Minimal defects at delivery		

System name _____ User name _____

Today's date _____ User title _____

Source: Quality Management Solutions

CW Chart: Daniel Guidera

NATIONAL
BRIEFS

Spring thaw

▶ When last seen, mainframe report management market competitors **Software Engineering of America, Inc. (SEA)** and **Mobius Management Systems, Inc.** were on icy terms: SEA hauled Mobius into court in January on charges of making false remarks about SEA products; Mobius called the suit "bizarre" and filed a countersuit.[CW, Feb. 4]. Earlier this month, the firms jointly issued the following statement: "The SEA suit against Mobius has been settled out of court to the satisfaction of both parties and the Mobius countersuit against SEA has been retracted."

And the beat goes on

▶ Analysts' predictions that 1991 would be a boom year for computer industry entries into the public market got another vote of support earlier this month as **Proteon, Inc.** registered with the Securities and Exchange Commission for an initial public offering of 3,100,000 shares of common stock. The Westboro, Mass.-based Token Ring networking and internetworking company offers a range of products aimed at integrating IBM and non-IBM systems into a single network.

Ashbrook leaves AST

▶ James Ashbrook, a five-year veteran of **AST Research, Inc.**, earlier this month resigned as senior vice president of marketing at the Irvine, Calif.-based personal computer vendor. Ashbrook cited personal reasons for the departure. He will continue as a consultant to AST, the company said.

The ride stuff

▶ When a computer vendor says it is tackling traffic problems, networking products come to mind. But the bridges **Apple Computer, Inc.** is talking about are the Golden Gate and Bay, and what it hopes to rout is air pollution. To give Apple employees a range of "environmentally responsible commute alternatives," facilities director Glenn Barber said, the Cupertino, Calif.-based firm recently rolled out a program offering options that include free shuttle buses to Apple sites, a fleet of company bicycles, access to an electronic ride-sharing database, telecommuting alternatives and a ride home in case of an emergency.

Keeping an eye on the East

U.S. firms are discovering the benefits of tracking Japanese competition

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — It was not too hard to convince executives at Motorola, Inc. that they needed an intelligence unit to monitor Japanese technology. Mark Stott, manager of strategic business research and a former Central Intelligence Agency analyst, told the story this way:

"We used to be in the television business. We used to be in the stereo business. And we face competition from Japan in the semiconductor business. Management decided we had to compete with Japan or else keep finding new businesses to be in."

At a recent conference sponsored by the U.S. Department of Commerce, Stott displayed some of the results of Motorola's intelligence effort, including a chart of the pretax profit margins of Japanese semiconductor companies. "For us," he said, beaming, "this is really useful information."

Motorola is one of a small number of U.S. companies that systematically monitor technology developments in Japan, overcoming language and business barriers. Most U.S. firms, however, are more worried about the "competitor next door" than about foreign rivals. As a result, they fail to have the kind of foreign technology tracking capability that is standard practice for Japanese businesses, several speakers said.

Monitoring Japanese technology requires a major investment in obtaining technical literature, learning the language and developing long-term relationships with Japanese companies and researchers, according to veteran Japan-trackers.

Business intelligence can be gleaned by participating in Japanese standards bodies, talking to trade associations, reviewing patents, creating joint ventures and attending trade shows in Japan. Thomas Kelly, a vice president at Eastman Kodak Japan Ltd., said the Japan Electronics Show held each October gives U.S. researchers a rare chance to see the most advanced components and talk with developers.

Avoid overload

There is so much Japanese technical literature available that collecting it all could quickly lead to information overload. To avoid wasting money, experts said, it is crucial to focus the intelligence effort on those nuggets of information needed by company decision-makers.

At the Microelectronics and Computer Technology Corp. (MCC), an advanced technology consortium in Austin, Texas, the technology monitoring effort is closely aligned with MCC's strategic business goals, according to Mark Eaton, director of international liaison for the consortium.

Like the intelligence operation at Motorola, MCC's operation has a direct effect on company decisions and on top management support. MCC's first chief executive was Adm. Bobby Inman, former director of the National Security Agency and deputy director of the CIA, Eaton noted.

He said the mission of MCC's intelligence unit — which has nine staffers and an annual budget of $750,000 — is to ensure the strategic success of MCC research by providing high-value intelligence to MCC researchers and member companies. It produces reports and a newsletter assessing foreign capabilities in 30 technologies, including speech-understanding technology, optical computing, fuzzy logic systems, parallel processing and computer-aided design.

On occasion, MCC even engages in reverse-engineering — that is, buying a Japanese product (such as a notebook computer) so that engineers can "torture components until they reveal their secrets," Eaton said.

Open-book plans

The MCC official said that corporate research plans in Japan are an open book, especially for far-out technologies. But the closer the technology gets to a commercial product, the more the research goes unpublished — much as it does in the U.S., Eaton and other speakers said.

While monitoring Japan from afar may be useful, some analysts argued that the only way to get genuine inside information is to spend a year working in a Japanese laboratory and trading information with researchers there. While many U.S. firms fail to take advantage of the opportunities to do that, there is in fact a great deal of Japanese traffic through U.S. laboratories, government officials said.

"If your company doesn't have two dozen people living in Japan, you haven't made a commitment to learn from Japan."

Continued on page 101

Monitoring the competition at the source

A sampling of companies in Japan willing to let U.S. researchers work in their research labs for extended visits

- **Fujitsu Laboratories Ltd.** (Kawasaki City)
  Telecommunications, information processing, personal computers.
- **Hitachi Ltd.** (Tokyo)
  Microelectronics, information technologies.
- **Japan Information Processing Co.** (Tokyo)
  Software engineering.
- **Minolta Camera Co.** (Osaka)
  Software engineering.
- **Nippon Telegraph and Telephone Corp.** (Tokyo)
  Networks, information processing, human interfaces, advanced electronics, software (including artificial intelligence).

Source: National Science Foundation, Tokyo office

CW Chart: Tom Monahan

Phoenix Technologies back to pretax profitablility

BY SALLY CUSACK
CW STAFF

NORWOOD, Mass. — While many computer industry companies found themselves blindsided by the recession during the recently closed first quarter of 1991, Phoenix Technologies Ltd. — a mid-1980s personal computer market highflier grounded in recent quarters — announced a return to pretax profitability.

In an announcement last week, the company reported pretax income of $343,000. After a provision for foreign withholding taxes, Phoenix Technologies reported a net loss of $188,000, or 2 cents per share for the quarter ended March 31 — its second quarter of fiscal 1991.

These results contrast sharply with Phoenix Technologies' pretax net loss of 46 cents per share reported for last year's corresponding quarter.

The company, which designs, develops and markets system software products for PCs and laser printers, last year fended off a hostile takeover attempt that was initiated by a private investment partnership consisting of Phoenix Technologies' stockholders. It recently introduced a video BIOS product designed specifically for laptop PCs.

First-quarter earnings 1991

Industry earnings continue to show brunts of recession, as Sequent Computer Systems, Inc. takes its first lumps in its eight-year history

Company	Revenue January through March 1991	Percent change from 1990	Profit January through March 1991	Percent change from 1990
Amdahl Corp.	$643M	(13%)	$11M	(93%)
Ashton-Tate Corp.	$63M	10%	$3M	—
Bustek Corp.	$6M	41%	$.8M*	20%
Informix Corp.	$39M	17%	($2M)	—
Legent Corp.	$47M	18%	($8M)	3%
Northern Telecom, Inc.	$1.9B	18%	$88M	19%
Sequent Computer Systems, Inc.	$48M	(8%)	($7M)	—
Silicon Graphics, Inc.	$133M	21%	$3.1M	(64%)
Software Publishing Corp.	$31M	3%	$89K	(98%)
Stratus Computer, Inc.	$101M	16%	$6M	16%
Unisys Corp.	$1B	9%	$37M	(53%)
Teradata Corp.	$65M	5%	$2M	(71%)*

*Pretax income; reduction of loss; **Includes nonrecurring charge

CW Chart: Doreen St. John

French firm aims to be info source abroad

BY CHRISTINE SIMONNET
IDG NEWS SERVICE

PARIS — Two years ago, Atoll, a Computer Intelligence subsidiary based here, set itself the challenge of producing a database of 100,000 leading European companies and distributing it throughout Europe. Atoll recently acquired the means to meet this challenge by opening international offices. Moreover, a merger with its French competitor, ITN Marketing, is expected to help it expand abroad.

Manuel Zebeida, managing director of Atoll and soon-to-be chief executive officer of the joint venture Computer Intelligence Europe, is not trying to hide the fact that this merger is a boost to his ambitions in Europe.

"Having more staff, and therefore more expertise, we will be able to accelerate our international development. Our two companies offer a variety of complementary services through databases. We will thus be able to offer a wider choice of services to our clients," he said.

Atoll's European venture began in 1989. Its takeover by La Jolla, Calif.-based market research firm Computer Intelligence brought it the know-how and the financial standing needed to ensure its development abroad.

TODAY, ATOLL'S DATABASE contains more than 100,000 references including large companies, computer professionals, smaller companies with more than 50 employees and large public bodies and services.

When the company was founded in 1986, computer-based marketing was still in its infancy and the new firm could only offer its clients a file containing the leading 5,000 French companies, with the names of directors and department heads. As far as environment was concerned, Atoll was at the time interested only in central computer sites.

However, the economic context of the computer sector changed, and French companies, attracted by the prospect of the large single market, began to export. Their information needs soon overran the French border, and Atoll's strategy had to expand to include all of Europe.

Today, Atoll's database contains more than 100,000 references including large companies, computer professionals, smaller companies with more than 50 employees and large public bodies and services. For each company listed, Atoll gathers information on directors, computer managers, workstations, microcomputer pools, networks, terminals, printers, hard disks and tape drives, operating systems, development tools and applications, which total more than 1 million systems on record.

In September 1990, Atoll had recorded 27,133 sites in France; 15,285 in Germany; 14,076 in Italy; 7,235 in Great Britain; 5,575 in Spain and 4,741 in Ireland, Austria, Switzerland, Belgium and Luxembourg. Only the Scandinavian countries do not appear in its files. ITN Marketing's database, which comprises 36,000 French computer sites, is expected to enhance the Atoll databank.

Information is available on printout, labels and electronic media. Atoll also provides access in France through its data communications number. Access from all over Europe is already available, and Atoll also plans to offer a multilingual service.

Zebeida's company already proposes marketing services based on this file, including direct mail and telephone marketing campaigns. However, this is done for computer-related budgets only: For example, for a marketing campaign, the cost per contact varies from 26 cents to 52 cents, depending on volume. These services are offered to the marketing and sales departments of computer companies in an effort to optimize the commercial productivity of sales teams by increasing their knowledge of their potential clients. It required two years and several millions of dollars to develop the European database.

In 1990, Atoll reported a turnover of $2.6 million — most of which came from France — compared with $1.7 million the previous year. According to Zebeida, 90% of the leading 500 French computer companies have already used the company's services at least once in one way or another. About 300 work on a regular basis with Atoll, and only about a dozen are based abroad. Zebeida said that he would like to have more international clients in the near future.

"In about four or five years, France is only expected to represent 20% of the company's overall revenue. This percentage corresponds to its economic importance in Europe. It is clear, therefore, that we must forget our French identity," Zebeida said.

Simonnet writes for Computer Reseller Europe, *an IDG Communications French publication.*

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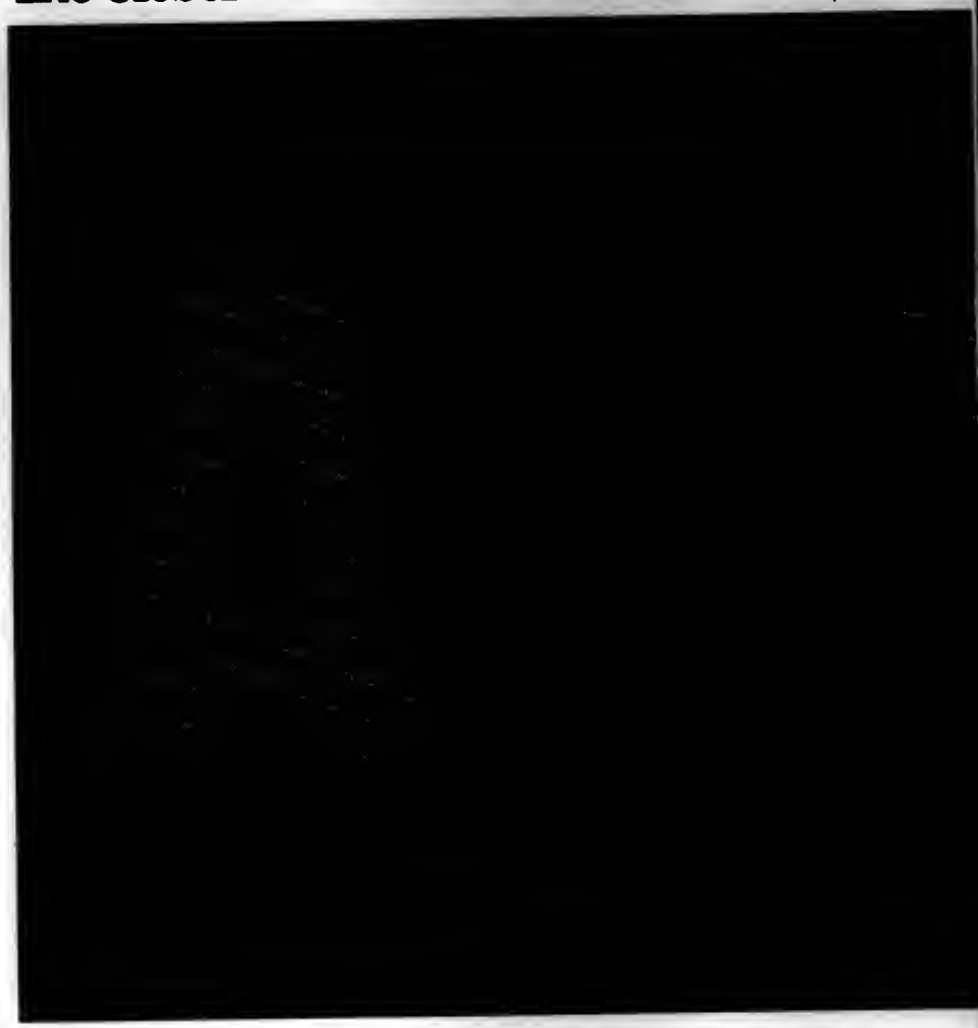

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SAP plays to global audience

BY SALLY CUSACK
CW STAFF

PHILADELPHIA — It is no secret that America's famed Madison Avenue approach to sales and marketing does not always fly in Europe, where businesses and consumers alike tend to follow more conservative lines.

This fact of global business life is posing a challenge for SAP America, Inc., the U.S. subsidiary of Walldorf, Germany-based SAP AG. The firm, which produces software for the IBM mainframe market, is establishing itself as a market force in the U.S. as well as abroad. With worldwide revenue of $350 million and 1,400 installations of the company's R/2 System, SAP appears adept at playing to both audiences.

According to James R. Bensman, president and chief executive officer of SAP America, the main challenge the company faces is cultural.

"One gets used to working with American companies with their tremendous sales and marketing programs, which focus on how things *look* as opposed to how things *are*," Bensman said.

In contrast, he said, the European approach to commerce focuses heavily on the long-term picture, with careful step-by-step movements along a charted path.

The company also provides a high degree of decision-making autonomy within the general framework of operations, according to Bensman. This approach, he said, lends itself to individual dedication to detail and excellence.

"Customers like our honest, straightforward approach," he added, alluding to the company's lack of glitzy ad campaigns. "The only common negative is that sometimes they find it hard to find us."

The traditional SAP customer is a Fortune 1,000 site with international operations. The R/2 System offers a range of business applications and supports seven languages as well as international currencies.

SAP has a worldwide clientele, including The Dow Chemical Co., Mobil Oil Corp., Shell Oil Co. and Du Pont Co.

Cinda Hallman, vice president of information systems at Wilmington, Del.-based Du Pont, said the company has enjoyed a good relationship with SAP in European operations for almost a decade.

"In 1989, we started to review areas we needed to operate on a global scale and found that SAP offered us a more extensive range of functionality for our specific operations," Hallman said.

Du Pont is running the software on IBM MVS/ESA and is implementing the R/2 System in several areas of manufacturing, including procurement, maintenance and cost management.

All SAP software is developed at the company's headquarters. The company employs 2,600 people worldwide; 650 employees are committed solely to product development. Approximately 80% of SAP's stock is still in the hands of the company's founders.

"They are extremely technology-oriented," said Erik Keller, program director at Gartner Group, Inc., a Stamford, Conn.-based market research firm. "They are continuing to gain market share in the mainframe MRP arena, where other software companies are losing ground or remaining flat."

Keller cited Andersen Consulting as SAP's primary competitor in the IBM 370 market. Second-tier competition, he said, includes Dun & Bradstreet Software's Amaps, and Computer Associates International, Inc.'s manufacturing resource planning (MRP) line.

Bensman maintained that the company will continue to guard its image of quiet, understated quality. "We believe in a long, carefully qualified sales cycle," he said, "and we will continue to balance our products and services."

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INTERNATIONAL BRIEFS

China goal

▶ Negotiations are ongoing toward **NCR Corp.**'s establishment of two joint-venture products in **China**. According to Daniel Lam, general manager of **NCR China**, one of the prospective ventures will assemble cash registers in North China, while the other will be responsible for producing printers in the south. Both ventures are expected to be operational by the end of 1992, Lam said. To a large extent, production resources will rely on local supply, as sales of the products will be focused on China's domestic market. NCR sales in China reportedly totaled $12 million in 1990, a 30% increase over 1989 figures.

The gain in Spain

▶ The **European Commission** earlier this month authorized the merger of French telecommunications firm **Alcatel** and Italian counterpart **Telettra**, provided the companies respect certain strict obligations imposed in the **Spanish** telecommunications market. Although the merger will affect markets in most of the 12 European Community countries, the commission investigation focused on the Spanish market, in which the combined forces of the two companies yield an 80% market share in transmission equipment.

High-performance computing plan offers multiple benefits

BY GARY H. ANTHES
CW STAFF

The High-Performance Computing and Communications program proposed recently by the White House — and some time earlier by several members of Congress — has received its most enthusiastic plug to date.

Gartner Group, Inc., a market research firm based in Stamford, Conn., said the program will generate a cascade of benefits, including a boost in the U.S. gross national product that could return the program's $1.9 billion investment by a factor of more than 100.

"Perhaps nowhere else could the expenditure of a relatively small amount of government funds have so great an effect on economic competitiveness," said George Lindamood, who led the study for Gartner Group. "The program would greatly improve American capability in semiconductor design, combustion efficiency, pharmaceutical design, speech and vision studies, oil and gas recovery, weather prediction and several areas of engineering."

The five-year program, unveiled by President Bush in his 1992 budget request and largely mirrored in legislation sponsored by Sen. Albert Gore (D-Tenn.), earmarks $682 million for research in high-performance computer systems, $662 million for work in advanced software, $390 million for development of a 1G bit/sec. National Research and Education Network and as much as $183 million in basic research and education.

Gartner Group's 308-page report, commissioned by the U.S. Department of Energy and the Los Alamos National Laboratory, said the program would affect both the rate and the direction of change in high-performance computing and communications. It also said the program will boost industrial productivity by increasing the rate of application of high-performance computing in industry.

Gartner Group said that while high-performance computing is considered out of the mainstream of the information industry, all computer users benefit from advances at the high end in a kind of "trickle-down effect," much as features perfected for race cars eventually end up on the family sedan.

Gartner Group's econometric model, borrowed from the University of Maryland, said the program will increase revenue to supercomputer vendors by $10.4 billion, or 28%, over the next decade. The study predicted that without the program, installed supercomputer processing power will grow by a factor of 125 over the decade; with the program, it would increase by 300 times.

An accompanying increase in supercomputer use in turn, will boost the productivity of key industries such as aerospace, chemicals and electronics as much as 3% or so. That will lead to an increase in gross national product between $173 billion and $503 billion over the decade, Gartner Group said.

Return on investment

According to an econometric model, the U.S. will get more than its money's worth from the High Performance Computer and Communications program

Economic impact of the federal HPCC program (range in 1982 constant dollars)

	Year 2000 only	1991-2000 cumulative
Gross national product	$29B to $84B higher	$173B to $503B higher
Personal consumption	$16B to $44B higher	$102B to $281B higher
Gross private domestic investment	$9B to $26B higher	$58B to $199B higher
Gross exports	$3B to $13B higher	$6B to $31B higher
Net exports (less imports)	$4B to $14B higher	$3B to $23B higher
Federal deficit	$13B to $31B lower	$75B to $190B lower

Source: Gartner Group, Inc. CW Chart: Doreen St. John

EXECUTIVE CORNER

New slate at IEEE

The Institute of Electrical and Electronic Engineers (IEEE) Computer Society has its 1991 slate of officers in place. At its helm is **Duncan Lawrie**, the head of the Computer Science Department at the University of Illinois in Urbana.

Lawrie, who served as the first director of the university's Laboratory for Advanced Supercomputers, will be presiding over the IEEE Computer Society as the Washington, D.C.-based organization celebrates its 40th-anniversary year.

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• National Research Council Office of Japan Affairs (Washington, D.C.)
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• National Science Foundation's Japan Program (Washington, D.C.)
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• National Technical Information Service (Springfield, Va.)
Publishes reports of the Japanese Technology Evaluation Center, which sends teams of U.S. experts to evaluate Japanese research in advanced computing, networking, manufacturing technology and electronics. Also has directories, newsletters and an on-line database; (703) 487-4650.

• Oryx Press (Phoenix)
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• Scan C2C, Inc. (Washington, D.C.)
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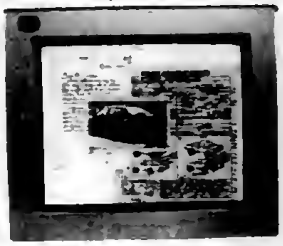

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CONTINUED FROM PAGE 97

asserted MIT professor Thomas W. Eagar.

Eagar cautioned that Japanese firms do not take kindly to American fishing expeditions and expect an equal information exchange. "Reciprocity rules," he said, explaining that if a U.S. researcher gives the Japanese a valuable, unpublished research paper, they will do the same in return.

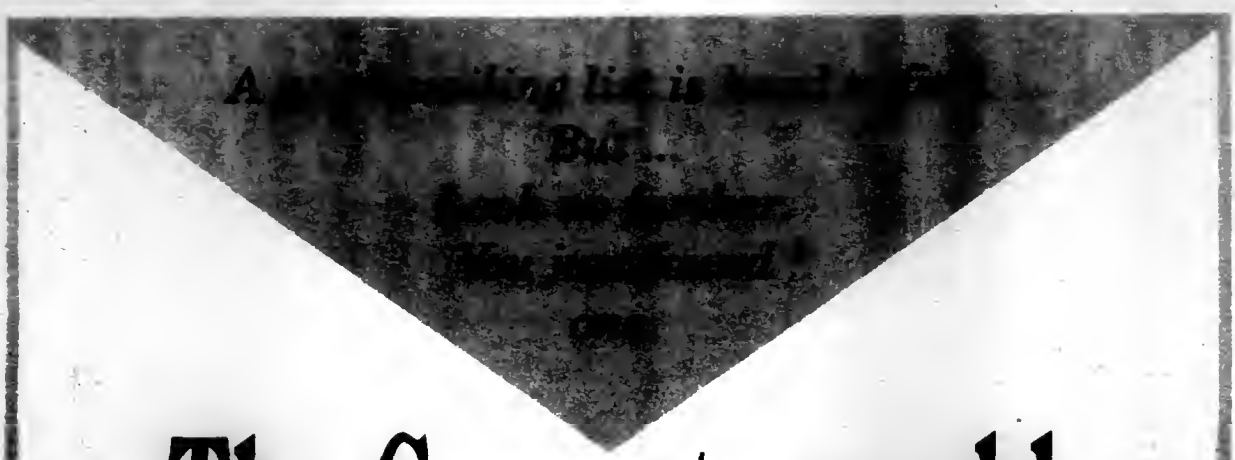
Preparation needed

Showing up at a Japanese research lab and asking, "What have you got?" will lead only to a very formal, superficial meeting in the conference room and lots of tea, several speakers observed.

U.S. researchers need to do their homework and be sure to ask the right questions if they expect to get the right answers.

Also, American scientists will have more fruitful relations with the Japanese if they learn to control their "awesome" egos and avoid poisoning the discussion with references to U.S./Japan trade frictions, Eaton added.

Karl Willenbrock, head of scientific, technological and international affairs at the National Science Foundation, said it is a myth that Japanese technology research is a closed operation. "There is access," he said, "but you have to do the accessing with skill."



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Middle-aged IS worker squeeze

Competition from college grads, retirees adds pressure to cutback trends

BY JANET MASON
SPECIAL TO CW

Ageism is a fact of life in the information systems profession, according to many of those in the trenches. The irony is, however, that age may be more of a negative factor for middle-aged IS professionals than their older colleagues.

IS professionals in the late 40s to early 60s age bracket are feeling the squeeze from downsizing and economic retrenchment more painfully than any other age group. Already crowded from behind by college graduates willing to start at lower salaries, they are also starting to see some competition from retirees, who provide a growing pool of on-call talent for organizations that want to minimize fixed costs.

"I've been through mergers, stages of evaluations, and I worry that if I get laid off three or four years from now and have to go out looking that I'll be in trouble," says Eric Hollenbach, a director of IS in his late 40s at Cleveland-based Lucas Aerospace, Inc.

IS professionals and recruiters say that technical workers are the ones most likely to feel the negative effects of ageism. "At the executive levels of IS, companies desire the grayer hairs and more experience," says Norm Sanders at executive recruitment firm Norm Sanders Associates in Haslet, N.J.

On the other hand, "a technical employee in his 50s will be competing with a 22-year-old right out of Stanford University who is willing to work for $25,000 a year," says Steve Mattimore, a recruiter at San Francisco-based Professionals for Computing, Inc.

Persistent preconceptions

Salary isn't the only factor that can work against older IS workers. There are also seldom expressed yet persistent preconceptions about flagging stamina and closed minds.

Although many IS professionals of that age know better, the perception that youth equals energy is a hard one to battle.

"By law you can't ask a person's age," Mattimore says. "However, the industry tends to favor young, aggressive people who can work the 60-hour week."

The best thing an IS professional can do to refute the perception that older professionals tend to become stagnant is to take the offensive and stay current, says 61-year-old Anthony A. Vallario, who will be retiring this July from his 40-year career at Bergen Brunswig Corp. in Orange, Calif.

THE BEST THING an IS professional can do to refute the perception that older professionals tend to become stagnant is to take the offensive and stay current.

ANTHONY A. VALLARIO
BERGEN BRUNSWIG

"Some IS professionals do become stodgy in their outlook, and they try to seek a comfort level," Vallario says. "People who let themselves become stagnant fall by the wayside." Instead, they should attend local chapter meetings of organizations such as the Society of Information Management, attend seminars and read various computer publications, he says.

Hollenbach, who follows this philosophy, also finds it helpful to stay up-to-date by sitting in on business planning meetings where he can show how IS is facilitating the company's goals. "Older IS people have to show their worth more [than younger ones]," he says. "People don't like to talk about [age] prejudice, but it's there."

On the other end of the spectrum, an increasing number of companies are looking to the retired ranks for expertise that can be tapped into on an as-needed basis.

The Travelers Corp. in Hartford, Conn., recognizes that it makes good business sense to supplement its work force with retired IS professionals who represent a reservoir of talent. The company set up a program in 1981 that not only draws from the experience of its own retired employees but also takes advantage of other IS professionals out of work because of corporate downsizing in the Northeast.

The benefits of using older employees is that they are "a dedicated work force who have a knowledge of the company and its history," says Diane Bengston, human resources director for data processing at The Travelers.

In addition, The Travelers estimates that the retiree consultant program has saved the company $1.2 million.

Sovran Financial Corp. in Norfolk, Va., also set up its own temporary help agency several years ago, which draws from a staff of 1,000 retirees and employees who wish to work part-time.

Tapping retired forces

Defense contractors have historically tapped into the retired work force, says Steve Fogle at Korn/Ferry International. In general, IS employees spend their entire careers in that industry, so their acquired knowledge and superior grasp of specialized technologies is in great demand on a contractor level, he says.

While such developments are good news for seniors, they may spell added competition for their slightly younger professional brethren, who are, in some cases, being advised to seek the consulting track themselves.

If an older employee is faced with finding a new job, the best thing he can do is head for the consulting track, Fogle says. "Older individuals give a lot of value back to companies because they understand the bigger picture more than a younger person would."

The most important piece of advice to aging IS professionals comes from Vallario: "Keep your focus on technology and business; don't be afraid to explore technologies; take risks, as long as they are calculated risks; and always try to improve what you've accomplished."

Mason is a free-lance writer based in Philadelphia.

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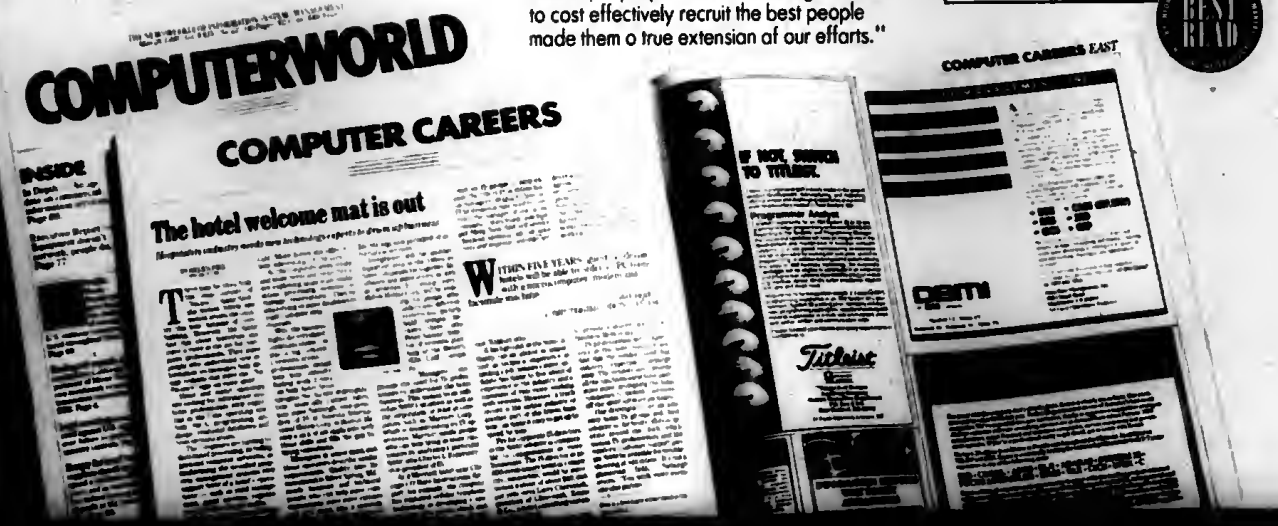

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Systems Analyst/Programmer II, 40 hrs/wk, 8-4:30, $2255.33/mo. Use DCDSS JCL with CRUL system to perform batch processing in Nonstop Mil Computer Uses TPR/TSM software to design/maintain on-line systems that access DRAM resident data bases. Requires application design using ADL software, HACHAL File Redirection in Management Information Systems, 3 mos. experience in JCL plus performance trends & on-line processing & in use of ADL HACHAL in generate source codes & update/extend database, part design of relational database & on-line system, and a master's degree or equivalent. Send resume with social security number to the Indiana State Employment & Training Service, 10 North Senate Avenue, Indianapolis, Indiana 46204, Attention: W.F. Shepherd. Job I.D. #3285133

Computer Software Engineer wanted to analyze complex systems requirements; and design, implement, support and maintain manufacturing, banking and accounting systems on UNISYS 80000, 67600, ASF, 5000 series and OPSCOS using COMS, SHAVE, NDLII, X.25 GATEWAY, DMSII software; ALGOL, COBOL, PASCAL, OCALGOL languages; and MCP, SL, STOGS operating systems. Requires Bachelor's degree in Electrical & Communications or Computer Engineering and two years experience in the job offered or two years related experience as a Systems Executive. $42,500.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref #19991 "Employer Paid Ad"

Manufacturer of radio positioning and security systems needs a Computer Systems Analyst to engage in design, development, implementation, testing and maintenance of embedded software for real-time positioning systems. Worldwide, a 40 hours, 8AM to 5PM and monday salary is $3,300. The position requires a Master's degree in Computer Science with one year experience as Systems Analyst or one year experience in Locating Computer Science. The position requires satisfaction with algorithm analysis, IBM PC/AT at low level, MOS 6502 assembly programming, multitasking real-time systems and applications. One year experience with C and assembly languages also required. Apply at the Texas Employment Commission, Fort Worth, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. J.O. #5421800. Ad paid by Equal Employment Opportunity Employer.

Senior Software Engineer wanted to analyze complex systems requirements, and design, develop and implement accounting and government systems on UNISYS A4, A6, 1100/2200, using DMS II, LINC, COMS, MARC, DM Inquiry, ERGO, WPL, RDMS SOFTWARE, COBOL languages, and MCP Operating System. Requires Master's degree in Management Science or Studies or Computer Science and one year experience in the job offered or one year related experience as a Systems Analyst/Programmer. $43,000.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref #20891 "Employer Paid Ad"

Senior Software Engineer wanted to design, develop, implement and support Government and R&D applications on CDC Cyber 170/730, HP1000, IBM 370 and IBM PC mainframes using CICS, IMS DB/DC and DMS 170 software, COBOL and PASCAL languages. Requires M.S. degree in Industrial & Management or Computer Engineering and one year experience in the job offered or one year related experience as a Systems Analyst. $35,000.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref #6191 "Employer Paid Ad"

SENIOR SYSTEMS PROGRAMMER: Will discuss with clients computer design system and will code algorithms in C and Pascal languages using computer algorithms. Will ensure that programs and software are properly integrated into computer system and will troubleshoot, modify, and correct programs and systems as necessary. Will perform system management enhancements as well as interface data structures as called for. Develops and will assist use of data. Requires Bachelor of Science degree in Computer Science. Education to include completion of one course in each of the following: Microcomputer in C, Structure Programming using Pascal, Language Design, AI/Natural Data Structures, and two courses in Computer Architecture using C. Hours: 8:00 a.m. - 5:00 p.m., 40 hours per week at $1,538.00 per week salary. Must have proof of legal authority to work in the U.S. Please direct resume to: Illinois Dept. of Employment Security, 401 S. State St., 7 South, Chicago, IL 60605. ATTN: L. DONEGAN, Reference #VJL-3270-D. NO CALLS. An Employer Paid Ad.

PROGRAMMER ANALYST I wanted. Duties: Working as part of a team providing data collection support for patient management and medical records application systems used in a hospital. Designing, developing, testing, debugging, and documenting changes and enhancements to this system, using an IBM 3090 computer and The following software: utilities and/or language: IMS, DCS, OSAVS, OSUCL, TSO/SPF, DB2/SQL, COBOL and UCC7. Working shifts as required in a 7-day, 24-hour daily operation. Need: Bachelor's in Computer Science and 2 yrs exp as a Programmer Analyst. The related exp. must include designing and developing business application software, using the following hardware/software: utilities and/or languages: IBM 3090 computer, IMS, DCS, OSAVS, OSUCL, TSO/SPF, DB2/SQL and COBOL. 1 addl. course each in data structures, systems programming, graphics theory, artificial language. Pay is $25,000 per year; 40 hr/wk. Resumes to 7310 Woodward Ave, Rm 415, Detroit, MI 48202. Ref. #23891. Employer Paid Ad.

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Software Engineer: Engineer and design advances in on-line transaction system applications utilizing software such as SCOBOL, CO-BOL, and 7AL; design and develop software for special customer applications; design, code, test and implement developments in system software; analyze and direct the application and implementation of developed technology into products line; prepare interim and final project reports for management. Bachelor's degree in Mathematics required. Three years experience as a Systems Analyst required. Experience as a Systems Analyst must include software design and development utilizing SCOBOL and C programming languages. 40 hrs./wk., 9 a.m. - 5 p.m. $40,000 year. Must have proof of legal authority to work permanently in the U.S. Send resumes to Illinois Job Service 401 South State Street, 3 South, Chicago, Illinois 60605. Admin. D. Rule #VJL-2333. NO CALLS. AN EMPLOYER PAID AD.

ENGINEER needed. Duties: Development, installation, and maintenance of real-time systems environment (Heavy Systems VRTXvelocity, RTAsks, and VMEbus) running on a Motorola MVME147SA-1 microprocessor hardware configuration. Design, development, test and maintain an in-house I/O processor which serves as the interface between a simulator's analog and digital hardware (e.g. switches, lights, etc.) and the VMEbus host. Design, develop, test and integrate multi-processor algorithmic task representation into the real-time simulation host software. Need M.S. in Computer Science and 1 yr exp as Research Assistant, Research Associate or Engineer. Need exp. should include system administration, network programming, and real-time system programming for ground-based simulators, processing and maintaining on an AT and 2 years UNIX operating system running on a Motorola MVE system; designing, developing and testing communications software for C language routines to simulator network; processing & proper environment for simulation; to exercise on MVME147SA-1 processor board; and designing, developing and testing software/hardware interfaces. Pay is $35,500 per year 40 hrs/wk. Resumes to 7310 Woodward Ave., Rm 415, Detroit, MI 48202. Ref. #24191, Employer Paid Ad.

Software Engineer, Windowing to design and implement user interface modules and interprocess communications modules software to interface access systems utilized by end users with data base systems, employing full range of windowing environments in PC and UNIX platforms including MOTIF, Open Look, Open Dialog and graphics packages including PHIGS and GKS. Qualified applicants must have M.Sc. or equivalent degree in Computer Science, one year experience in Software Engineering involving Windowing, and thorough proficiency in full range of windowing environments in PC and UNIX platforms including MOTIF, Open Look, Open Dialog and graphics packages including PHIGS and GKS. Salary: $45,000 per year plus employee benefit plan; 40 hour week. Respondents must presently be eligible for permanent employment in the U.S. Position is with computer consulting firm located in St. Louis County, Missouri. Send resume and details of required experience and proficiencies to: Mrs. Jimmie Gaston, ID#454289, Missouri Division of Employment Security, 605 West Main Street, St. Louis, Missouri 63101. An Equal Opportunity Employer. An Employer Paid Ad.

HARDWARE ENGINEER needed. Duties: Development and design of test equipment for vehicle electronic control modules. Testing, shipping, and verifying designs such as microprocessor and 4 wheel antilock brakes and speedometer modules. Signal analysis, computer interfacing, logic, mixed signal and based timed circuit design. PC board layout. Applying computer interfacing to data acquisition systems. Embedded microprocessor circuit design with single chip microcontrollers. Using the computer aided design system for schematic entry. Circuit trouble shooting, electromagnetic interference, programming assembly language PASCAL and Assembler on IBM PC/AT computers. Requirements: Master's in Electrical or Electronic & Systems Engineering and 3 yrs. exp as an Engineer. Related exp. must include using these hardware/software systems: 5-100 IBA bus, RS-232 serial communications, Motorola 6800 series and test state assembly language, Intel 8051 and Motorola 68HC11 single chip microcontrollers. Pay is $31 per hour, 40 hour week. Resumes to 7310 Woodward Ave., Rm 415, Detroit, MI 48202. Ref #19491, Employer Paid Ad.

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Senior Software Engineer wanted to analyze complex systems requirements; design, develop, analyze, implement and support manufacturing application systems on UNISYS A-SERIES mainframe environment. The applicant should have a minimum of two years experience programming in UNISYS A-SERIES RPG and at least three years working experience with A-SERIES architecture. Prospects having an equivalent number of years experience in IBM RPGIII will be considered. Softgoods manufacturing applications experience and familiarity with PC's and PC environmental products such as LOTUS, EXCEL and DBASE will be considered a plus. Please send resume and salary history to: CWS8705, Computerworld, Box 9171, Framingham MA 01701-9171. EEO/M/F

Senior Computer Software Engineer wanted to analyze complex systems requirements; design, develop, analyze and implement manufacturing application systems on IBM 3090, IBM PC using DCDS, 84SQDC, DB2, XPEDITER/TSO ISPF, IMS/DB, JCL, SCREEN PLUS, SDL Forms software, COBOL, CLIST languages; and MVS/XA, MSDOS operating systems. Requires Master's degree in Computer Science and one year experience in the job offered or one year related experience as a Systems Analyst. $41,000.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref #22791 "Employer Paid Ad"

Instrumentation and Controls Engineer to design and develop programmable control systems and instrumentation therefor; responsible for layout of instrumentation, piping and instrumentation drawings, system design documentation and installation of major computer instrumentation projects for industry. Require B S E E E (Major in Instrument Technology) and two years' experience 40 hrs/wk, 8 A M to 5 P M Salary $3600 per week. Apply with resume to: 7310 Woodward Avenue, Room 415, Detroit, MI 48202. Reference No. 25791. Employer Paid Ad.

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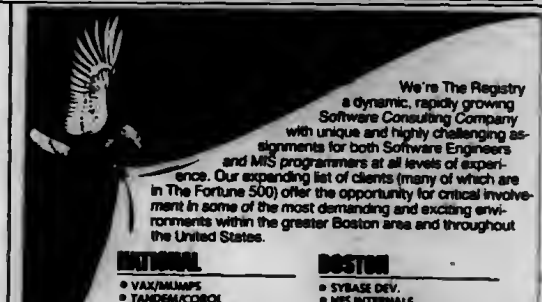

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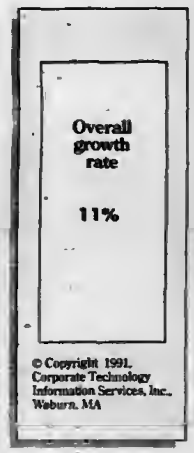

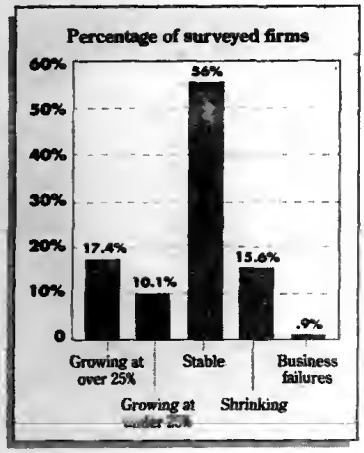

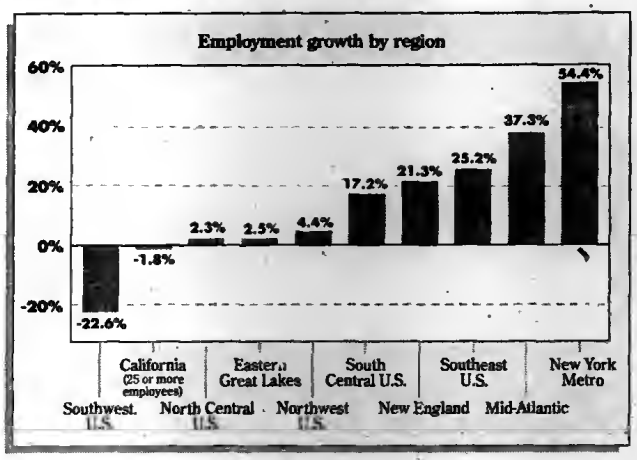

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PC dealer competition creates buyers' market

BY WILLIAM BRANDEL
SPECIAL TO CW

When Motown sneezes, car dealers get pneumonia — or so the saying goes in Detroit. Apply that adage to the slowed growth in the personal computer market, and it explains a lot of the deals and juicy service offerings information systems managers are seeing from PC dealers.

"Everyone is selling the same box, and that reduces it to a [commodity] price issue," says Dan Ness Jr., a PC analyst at Computer Intelligence, a market research firm in La Jolla, Calif. "Either the dealer has to become a high-margin, low-volume seller or a low-margin, high-volume dealer. Either way, the dealers stuck in the middle are getting the squeeze."

"It's really a cutthroat business out there," says Rich Starks, manager of office technology and training at Prudential Insurance Company of America in Fort Washington, Pa. "Dealers are constantly knocking on our doors trying to make an arrangement for some new type of business."

The knocking is so frequent and insistent at Northeast Utilities in Hartford, Conn., that Ed Peczynski, manager of client services, has learned to play a good game of cut and switch.

"We might be extremely comfortable with a given dealer," Peczynski says, "but if their price is out of line, we just switch to another one." Northeast Utilities, which currently has 2,500 users working mainly on IBM Personal System/2s and Intel Corp. 80386SX microprocessors, takes the estimated annual amount that it plans to spend on dealers (about 10% of the IS budget) and divides it among a given number of dealers.

"We let them know that they are getting a given percentage of our budget but don't tell them how much that is," Peczynski says. "Then, we leverage one dealer against another."

Prices aren't the only things that have become negotiable in these tighter times. Peczynski says he is finding that dealers are willing not only to knock down prices but also to add attractive service options.

"Their big sell now is more and more service arrangements; the power deal is options," he observes. "In the past, dealers only offered razor-sharp pricing or good technical support — one or the other. Now, you can have both."

The major goal for dealers is to achieve some margin through added-value options. One salesman for a major chain says he is now making paper-thin markups on the products he sells to accounts. "The only way to make any money now is service contracts, charging for time and materials and maintenance agreements," he says. However, there is some question about how much extra these additional options are *really bringing into the marketplace*. These service deals may help him to stretch a dollar, Peczynski says, but they don't stretch the company's spending. What's planned at the start of the year is what Northeast Utilities spends.

With dealers falling all over themselves to cut deals, even mail-order vendors are feeling pressure to offer something more than bargain prices, such as service.

What you see is a lot of "changing stripes" in the market, Ness says. Even mail-order company Dell Computer Corp. has an agreement with Xerox Corp.: Xerox services and maintains Dell equipment at corporate sites.

However, not every IS manager considers dealers interchangeable. Some say there is a lot more to dealer selection than price and option packages, and, they say, it would take a really exceptional deal to induce them to make a switch.

> "IT'S REALLY A cutthroat business out there. Dealers are constantly knocking on our doors trying to make an arrangement for some new type of business."
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For the past five years, Fleming Companies, Inc. in Oklahoma City, Okla., has worked with the same management, sales representatives and technicians at Computerland Corp., says Janis Meyer, information center manager at Fleming. She says that at this point, Computerland technicians know the department personnel, strategy and goals.

Meyer notes that "unless there is a compelling reason to change," such as a sudden deterioration in service or price rates that are totally out of whack with the rest of the market, "a small change in price alone is not a good reason to switch."

Whether they switch or stay, computer purchasers are likely to see further changes in their dealers. Many operations are either acquiring competitors or being acquired, according to Ness. For example, Computerland, tired of competing with Nynex Business Centers, signed a letter of intent to purchase the chain in March. The end result is one less dealer chain and one much larger dealer.

Furthermore, Ness says, the superstore loaded with products on prime downtown real estate is on its way out. Dealers will want to get closer to their accounts, and that is most likely to mean more knocks on the door from salesmen who make account calls.

Brandel is a free-lance writer based in Boston.

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	Closing price	Recent high	Recent low
IBM PC Model 176	$250	$450	$200
XT Model 089	$500	$550	$450
AT Model 099	$650	$775	$500
AT Model 239	$725	$925	$700
AT Model 339	$875	$1,000	$800
PS/2 Model 30-286	$1,100	$1,300	$1,000
PS/2 Model 60	$1,300	$1,700	$1,300
PS/2 Model 70P	$3,200	$3,500	$3,000
Compaq Portable II	$900	$1,050	$875
Portable 286	$1,100	$1,350	$1,000
SLT 286	$2,250	$2,500	$2,000
Portable 386	$2,300	$2,500	$2,200
LTE 286	$2,200	$2,500	$1,900
Deskpro 286	$800	$1,000	$700
Deskpro 386/20	$2,150	$3,000	$2,000
Apple Macintosh Plus	$750	$975	$700
SE	$1,125	$1,250	$1,100
II	$2,600	$2,800	$2,400
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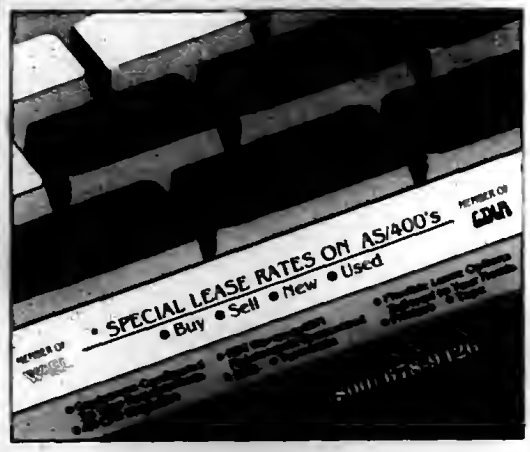

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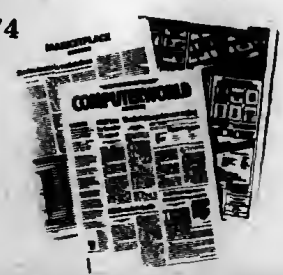

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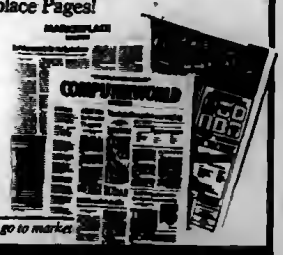

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Simulators key to nuclear plant training

BY CHRISTINE CASATELLI
SPECIAL TO CW

In the nuclear industry, one mistake can spell disaster. If anyone had any doubts about that, the accident at Three Mile Island in 1979 dispelled them.

After that incident, Congress gave the Nuclear Regulatory Commission (NRC) authority to shut down nuclear power facilities that do not conform to federal standards for the training and certification of plant operators and technical staff.

As a result of close NRC scrutiny — and because nuclear facilities lose money for every day they are shut down — training nuclear plant operators on critical applications is serious business. It is also a complex undertaking.

Nuclear plants are governed by a delicately calibrated mixture of computers and instrumentation, and bringing operators to a point of true proficiency can take one year or more, with hundreds of hours of classes and simulator experience.

A simulator is a mock, computer-driven control-room setup designed to look, sound and react just like the individual plant's actual controls.

At the Pilgrim Nuclear Power Plant in Plymouth, Mass., plant operators undergo training for 320 hours per year, says Jack Alexander, nuclear training manager. "That's why the plant has two simulators — so that training and refresher courses can continue even if one system needs to be repaired or upgraded." And when the control room systems get a major enhancement, so do the simulators.

Some plants combine simulator training with video feedback to enhance learning retention. The Tennessee Valley Authority Nuclear Plant in Brown's Ferry, Ala., for example, uses a closed-circuit television system and videocassette recorder to record what crew members are doing and then critique their actions, says Tommy Albright, simulation manager at the plant.

One of the more time-consuming aspects of training is constructing simulator models, according to Jeffrey Angstadt, a computer analyst at Pennsylvania Power and Light Co. in Susquehanna, Pa.

"What's involved is combining lots and lots of plant data to build software models, which must go through a rigorous testing criteria," he says.

Pennsylvania Power and Light is in the midst of replacing its 12-year-old simulator with an enhanced, more powerful model that runs off of an Encore Computer Corp. 2040 minicomputer and incorporates five instructor workstations. This setup will allow a trainer to monitor simulator activity from different data on all the screens and test students on anything from routine operations to big-time meltdowns. The project will cost in excess of $10 million and is slated for operation in 1992.

Because it is impossible for inspectors and examiners to certify the preparedness of nuclear plant operators unless they have a detailed grasp of what these operators need to know, the NRC puts its watchdogs through rigorous training at its own National Technical Training Center in Chattanooga, Tenn.

Training at the NRC center starts with three weeks of classroom sessions on how the plant control system works, including systems integration and appropriate responses to plant events.

Next, trainees are subjected to two weeks of simulator instruction. The speed and sophistication of today's simulators allow students to get an accurate idea of what it is like to sit at the controls of a nuclear power plant. "If you walked into the simulator room, you would think you were walking right into the control room of a nuclear power plant," says Kenneth Raglin, director of the NRC training center.

Casatelli is a free-lance writer based in Washington, D.C.

Computers, networks control sites

Over the years, nuclear facilities have relied more and more on computers to monitor plant conditions and alert plant operators when something is amiss.

For example, electronic sensors attached to critical components, such as steam pipes, take readings at least every second, digitize them and relay the raw data over communication lines to on-site plant mainframes, minicomputers or super minicomputers, which convert it into engineering terms that operators understand.

In the control room, the plant information appears in numeric or graphical form on terminal screens so operators can check conditions at a glance. "There is a historical recording feature at some of the plants, if they want to keep a record of what happened," says Pennsylvania Power and Light's Jeffrey Angstadt.

Some plants use a wideband network, which collects all of the plant's vital statistics — such as temperature and pressure — and transmits the information over a single cable.

"In older plants, the sensors are wired back to a panel, and computers obtain the information from there," says Tom Fukushima, general manager at S. Levy, Inc., a consulting firm in Campbell, Calif., that specializes in the nuclear industry. "More of the newer plants are putting in distributed networks using multiplexers, where sensors bring in information locally and use a common cable to route it back to the computers," he says.

While it is essential for the plant systems staff to have a working knowledge of computing and network strategies in order to keep the reactors humming, nuclear plant operators can also benefit from training in systems integration and communications, Fukushima says.

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INDUSTRY ALMANAC

ANALYSIS IN BRIEF

Semiconductor shipments and orders have skyrocketed compared with last year, but few U.S. vendors are as happy as the jump in book-to-bill ratio suggests. The ratio generalises a business that can no longer be generalised. Different parts of the market are seeing vastly disparate business conditions. For example, integrated circuit orders have grown dramatically, while bookings of niche components such as diodes and transistors have increased only slightly.

Economic and war-related uncertainties caused computer makers to hold inventory levels low. As those issues began to lift, so did chip orders.

Texas Instruments, Inc. and **Micron Technology, Inc.** stand to benefit from the current upward price pulse of dynamic random-access memory chips. Look for an upside earnings surprise from **Intel Corp.** at the quarter's end, caused by accelerated orders for its 80386 chip. — *Systems, Silicon & Software, What's in a Book-to-Bill? Donaldson, Lufkin & Jenrette, Inc., April 1991.*

April's earnings reports show some strong spots in the technology industry, such as mainframe software and workstations, but the rest of the sectors seem to be slipping. Recessionary fears combined with a strengthening dollar and weakening economies overseas will deflate profits.

Among the safe havens where business is solid are **Legent Corp.**, **Cognos, Inc.**, **Computer Associates International, Inc.** and **BMC Software, Inc.** For now, however, wait for the damage to be done by negative earnings reports from other companies, then make investment picks when the dust settles. — *Technology: Computer Services/Software, Mabon, Nugent & Co., April 1991.*

RECOMMENDATION CHANGES

DOWNGRADED FROM BUY TO MODERATELY ATTRACTIVE: **Symantec Corp.** (Donaldson, Lufkin & Jenrette). Reason: Shares have risen 100% this year and are now overvalued, trading at more than 33 times 1991 earnings-per-share estimate.

UPGRADED FROM HOLD TO BUY: **LSI Logic Corp.** (Alex. Brown & Sons, Inc.). Reason: Company is the best positioned semiconductor maker in the U.S. to benefit from a cyclical upturn in the chip industry; new products, including its 40-MHz Sparcstation 2 processor, are proving manufacturing prowess.

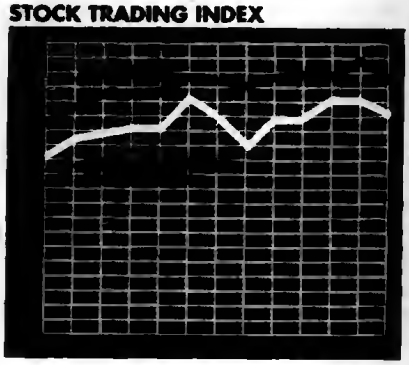
UPGRADED FROM HOLD TO BUY: **Tektronix, Inc.** (Prudential Securities, Inc.). Reason: Stock will advance into low $30 range within one year; administrative costs, combined with the probable closing of some facilities, may lead to small revenue growth next year.

UPGRADED FROM OUTPERFORM TO BUY: **Motorola, Inc.** (Shearson Lehman Brothers, Inc.). Reason: Cost control is now excellent; quarter just reported showed substantially higher profits vs. last year's figures for both the communications and semiconductor divisions.

DOWNGRADED FROM BUY TO HOLD: **Sequent Computer Systems, Inc.** (Prudential Securities). Reason: Shortfall in current quarter resulted from weak sales from OEM sector and under-par direct sales; however, once economy brightens, company's sales will increase.

KIM S. NASH

STOCK TRADING INDEX



THIS WEEK'S HIGHLIGHTS

- *When Compaq Computer Corp. hit Wall Street with a poor earnings forecast (see story page 4),* investors lashed back: Compaq's stock sank 9¼ points, closing at 52½ Thursday. Among other systems companies reporting financial results, Sun Microsystems, Inc. basked in a four-point advance to 38¼, while Sequent Computer Systems, Inc. dropped 1⅛ to 16⅛ with news of a quarterly loss. Data General Corp. achieved a second straight quarterly profit and moved up 3⅛, closing at 18.
- Market watchers were unimpressed by the restoration of Ashton-Tate Corp.'s Dbase copyright. The software maker's stock dug in at 9⅝ Thursday, down ⅛ of a point. Lotus Development Corp. jumped 2¾ points to 32¼, but Microsoft Corp. crashed 9¼ points, landing at 100¾.
- *High-volume traders last week included* Apple Computer, Inc., falling 2½ to 58½; Seagate Technology, Inc., fading ⅜ of a point to 13¼; and MCI Communications Corp., losing ⅛ of a point to close at 28¼.

Computerworld Friday Stock Ticker

CLOSING PRICES FRIDAY, APRIL 26, 1991

TOP PERCENT GAINERS

Data General Corp.	16.13
Sun Microsystems Inc.	12.09
Lotus Development	11.89
Software Publishing Corp.	11.39
Microgate	10.10

TOP PERCENT LOSERS

Legent Corp.	-18.75
Intelligent Systems Corp.	-18.67
TeleVideo Systems	-16.53
Compaq Computer Corp.	-13.40
Maestro Systems	-12.50

TOP DOLLAR GAINERS

NCR Corp.	6.75
Sun Microsystems Inc.	4.13
Lotus Development	3.89
Data General Corp.	2.50
General Motors E (EDS)	2.38

TOP DOLLAR LOSERS

Compaq Computer Corp.	-8.13
Legent Corp.	-6.75
Microsoft Corp.	-6.50
Computer Sciences	-4.75
Digital Equipment Corp.	-2.63

Exch	52-Week	Range		April 26 Close	Wk Net Change	Wk Pct Change
Communications and Network Services						Off 1.24%
OTC	10.00	5.38	3 COM Corp.	8.75	-0.25	-2.78
NYS	69.75	52.50	American Info Techs Corp.	64.00	-1.00	-1.54
NYS	44.13	29.00	AT&T	37.50	0.25	0.67
OTC	0.75	0.00	Ariel Communication Corp	2.00	-0.16	-5.88
NYS	56.25	39.50	Bell Atlantic Corp.	47.88	-0.75	-1.54
NYS	47.63	40.00	Bellsouth Corp.	51.16	-0.50	-0.97
NYS	44.00	13.10	Cabletron Systems	39.38	-2.25	-5.41
OTC	8.88	6.25	Compression Labs Inc.	19.83	-0.25	-1.26
NYS	41.25	23.38	Contel Corp.	41.00	0.00	0.00
OTC	5.13	1.94	Data Switch Corp.	6.75	-0.18	-3.23
NYS	29.75	6.88	Digital Comm Assoc.	20.00	-0.63	-3.00
OTC	25.25	12.25	Dynatech Corp.	20.75	-0.25	-1.19
OTC	12.88	5.50	Fibronics Int'l Inc	9.50	-0.25	-2.70
OTC	4.00	1.75	Gandalf Technologies Inc.	8.00	-0.38	-11.11
NYS	4.50	1.63	General Datacomm Inds	3.25	-0.25	-7.14
NYS	34.13	23.50	GTE Corp.	31.13	-0.63	-1.97
OTC	4.50	0.75	Infotron Systems Corp	1.25	-0.25	-16.67
NYS	50.88	40.25	ITT Corp.	50.13	0.25	0.42
OTC	44.13	17.88	MCI Communications Corp.	28.75	0.13	0.44
OTC	21.00	2.75	Microcom Inc.	8.00	0.50	6.68
NYS	111.63	47.00	Network Equipment Tech	7.88	0.88	0.00
OTC	14.63	4.00	Network General	8.00	0.16	1.41
OTC	15.50	6.13	Network Systems Corp.	12.25	1.10	10.11
NYS	34.50	22.16	Northern Telecom Ltd.	34.50	1.63	4.94
OTC	36.50	17.25	Novell Inc.	25.25	2.25	9.25
NYS	69.50	47.00	Nynex Corp.	72.00	-0.50	-0.69
NYS	47.88	38.25	Pacific Telesis Group	41.75	0.50	1.21
ASE	15.38	6.75	Penril Corp.	14.50	0.00	0.00
NYS	23.13	8.88	Solaratic Atlantis Inc.	10.16	-1.63	-9.70
NYS	58.88	47.25	Southwestern Bell Corp.	53.00	-1.00	-1.85
NYS	46.38	20.63	United Telecom	25.88	-0.13	-0.69
NYS	40.75	32.38	US West Inc.	37.88	-0.88	-0.99
Computer Systems						Off 2.61%
OTC	0.75	0.56	Altera Computer Sys.	1.25	-0.13	-0.00
ASE	16.88	10.00	Amdahl Corp.	16.00	-0.50	-3.03
OTC	73.25	34.25	Apple Computer Inc.	58.50	-1.13	-1.88
OTC	13.88	4.25	Archive Corp.	8.00	-0.63	-7.25
OTC	32.75	7.50	AST Research Inc.	25.00	-2.50	-9.00
NYS	7.88	3.88	Bolt, Beranek & Newman	6.88	0.00	0.00
NYS	21.63	4.88	Commodore Int'l	16.38	-0.13	-0.80
NYS	74.25	69.50	Compaq Computer Corp.	52.50	-8.13	-13.40
OTC	1.75	0.13	Computer Automation Inc.	1.13	0.00	0.00
NYS	21.63	8.75	Control Data Corp.	12.50	-0.50	-3.85
NYS	20.88	8.38	Convex Computer	17.00	-1.13	-11.11
NYS	61.25	20.00	Cray Research Inc.	37.38	-1.16	-2.92
NYS	19.00	8.50	Data General Corp.	18.00	2.50	16.16
OTC	3.25	0.75	Datapoint Corp.	1.63	-0.13	-7.14
NYS	69.63	8.88	Dell Computer Corp.	23.50	-0.63	-2.59
NYS	95.13	45.50	Digital Equipment Corp.	89.00	-2.63	-2.86
NYS	89.13	13.75	Harris Corp.	89.88	0.88	1.42
NYS	64.25	24.88	Hewlett Packard Co.	53.63	0.62	7.16
NYS	109.75	69.25	IBM	108.00	-1.50	-1.37
OTC	14.00	7.75	Information Int'l	8.00	-0.13	-1.54
OTC	21.50	10.50	Intergraph	20.50	0.75	2.61
NYS	3.00	0.50	MAI Systems Corp.	0.88	-0.06	-6.27
NYS	189.75	114.00	Matsushita Electronics	124.50	-1.63	-1.29
OTC	8.00	6.00	Mentor Graphics Corp.	15.50	-0.50	-2.94
NYS	103.50	44.50	NCR Corp.	103.50	6.75	6.98
OTC	36.50	11.00	Pyramid Technology	25.75	-1.00	-3.74
OTC	34.00	8.75	Sequent Computer Sys.	16.88	-2.88	-14.78
NYS	47.88	18.00	Silicon Graphics	89.38	-1.00	-2.54
NYS	37.25	14.63	Stratus Computer Inc.	35.63	-0.88	-2.40
OTC	69.25	18.00	Sun Microsystems Inc.	36.25	4.18	12.06
NYS	20.88	8.88	Tandem Computers Inc.	10.75	1.13	7.20
NYS	69.50	23.50	Tandy Corp.	32.75	-2.63	-7.43
OTC	32.00	0.75	Teradata	17.88	-2.25	-11.16
NYS	7.88	1.38	Ultimate Corp.	4.75	0.00	0.00
NYS	11.88	1.75	Unisys Corp.	4.50	-0.25	-5.88
ASE	5.75	2.00	Wang Labs Inc. (b)	3.88	-0.25	-6.87
Software & DP Services						Off 1.25%
OTC	63.00	17.00	Adobe Systems Inc.	55.00	-2.00	-3.51
OTC	89.88	20.00	Aldus Corp.	48.25	-1.88	-3.74
OTC	69.50	12.00	American Mgmt. Systems	26.75	0.75	2.88
OTC	16.25	7.50	American Software Inc.	12.25	1.00	8.88
NYS	4.63	1.38	Answerp Inc.	3.63	0.00	0.00
OTC	23.50	10.00	Analysts Int'l	15.00	-0.75	-4.76
OTC	13.25	4.88	Ashton Tate	9.00	-0.13	-1.29
OTC	10.25	4.00	ASK Computer Sys.	8.50	-0.16	-1.88
NYS	71.25	46.25	Auto Data Processing	69.25	-0.75	-1.07
OTC	50.88	32.00	Autodesk Inc.	53.75	-2.25	-4.02
OTC	31.50	13.50	BGS Systems Inc.	27.75	-0.75	-2.63
OTC	43.88	17.75	BMC Software Inc.	40.50	-0.25	-0.61
OTC	21.50	11.50	Boole & Babbage Inc.	11.50	0.50	4.55
OTC	64.25	14.50	Borland Int'l	57.00	-1.50	-2.56
NYS	0.75	0.06	Businessland Inc.	2.00	0.13	6.67
OTC	20.88	5.13	Cognos Inc.	10.75	-0.75	-3.86
NYS	10.88	4.38	Computer Associates	9.00	0.13	1.41
OTC	17.75	10.75	Computer Horizons	12.50	-0.75	-4.88
NYS	73.25	36.75	Computer Sciences	85.88	-4.75	-9.73
NYS	11.75	3.50	Computer Task Group	10.25	-0.13	-1.25
OTC	25.25	10.00	Comshare Inc.	18.75	-0.13	-0.66
OTC	10.00	3.75	Corporate Software	11.75	-0.63	-5.05
NYS	69.63	27.88	General Motors E (EDS)	69.63	2.38	3.14
OTC	10.75	7.25	Goal Systems Int'l	14.25	-1.50	-9.52
OTC	5.75	1.88	Logicon Systems Inc.	5.00	0.38	8.11
OTC	10.75	7.75	Information Resources	18.00	-0.50	-2.70
OTC	17.50	2.63	Informix Corp.	6.25	-0.75	-10.71
OTC	7.38	1.88	Intelligent Inc.	1.94	-0.10	-4.90
OTC	8.10	2.50	Interleaf Inc.	6.38	-0.62	-8.83
OTC	43.25	10.00	Knowledgeware Inc.	89.00	-1.00	-2.50
OTC	45.00	16.75	Legent Corp.	29.25	-6.75	-18.75
OTC	39.25	12.50	Lotus Development	32.25	3.38	11.69
OTC	32.00	13.50	Microgate	21.75	2.00	10.11
OTC	117.50	50.75	Microsoft Corp.	100.75	-6.50	-6.06
NYS	10.50	4.00	On Line Software Int'l	8.88	0.25	2.90
OTC	24.00	4.88	Oracle Systems	10.16	-0.25	-2.41
NYS	14.88	7.00	Parasitic Systems	8.00	0.00	0.00
OTC	6.25	1.25	Phoenix Technologies	8.16	-0.50	-9.80
NYS	52.00	32.25	Policy Management Sys.	45.00	-2.63	-5.51
NYS	23.63	11.50	Reynolds & Reynolds	19.75	-1.63	-7.60
NYS	10.13	6.88	Sage Software Inc.	11.25	0.75	7.14
OTC	25.50	14.75	SEI Corp.	24.00	0.00	0.00
OTC	21.75	12.25	Shared Medical Systems	21.88	0.38	1.75
OTC	36.25	12.00	Software Publishing Corp.	22.00	2.25	11.39
NYS	18.63	9.50	Sterling Software	10.63	0.50	4.94
OTC	26.00	9.50	Sungard Data Sys.	17.25	0.50	2.99
OTC	35.88	17.75	Symantec Corp.	47.25	1.75	3.85
NYS	24.50	4.50	System Center Inc.	7.50	-0.25	-3.23
OTC	37.25	12.75	System Software Assoc.	20.00	-1.00	-4.76
OTC	27.88	4.75	Wallach	14.88	-0.63	-4.03
Semiconductors						Off 1.30%
NYS	14.88	6.63	Advanced Micro Device	14.88	0.75	5.56
NYS	12.50	6.88	Analog Devices Inc.	10.63	-1.13	-9.57
OTC	21.75	8.25	Chips & Technologies	10.00	-0.25	-2.44
OTC	66.25	28.00	Intel Corp.	53.00	0.13	0.24
NYS	13.00	5.16	LSI Logic Corp.	11.88	0.13	1.06
NYS	19.16	9.75	Micron Technology	18.88	-0.88	-4.83
OTC	21.50	7.25	MIPS Computer Systems	17.63	-0.88	-4.73
NYS	69.88	59.75	Motorola Inc.	65.75	0.75	1.15
NYS	14.88	7.00	National Semiconductor	7.75	-0.13	-1.59
NYS	47.63	32.50	Texas Instruments	42.00	-0.63	-1.47
OTC	12.25	9.00	VLSI Technology	11.63	0.38	3.33
ASE	14.88	4.00	Western Digital Corp.	5.63	-0.13	-2.17
Peripherals & Subsystems						Off 2.45%
OTC	2.75	0.88	Apertus Technologies	2.44	-0.06	-2.69
OTC	24.00	7.50	Benchtec Inc.	19.25	0.25	1.32
OTC	17.38	4.25	Corrobor Corp.	15.50	0.25	1.63
ASE	11.75	4.13	Cognitronics Corp.	8.88	-0.38	-3.86
NYS	21.25	14.88	Conner Peripherals	20.38	-0.88	-3.21
ASE	22.00	7.00	Datatrak Corp.	16.13	-0.80	-4.71
NYS	12.25	4.25	EMC Corp.	11.88	-0.25	-2.15
NYS	47.88	33.75	Eastman Kodak Co.	43.00	-0.38	-0.86
OTC	11.88	4.75	Emulex Corp.	8.38	-0.13	-1.80
OTC	24.50	14.00	Evans & Sutherland	21.75	0.75	3.57
OTC	8.50	3.75	Iomega Corp.	6.88	0.00	0.00
OTC	28.88	8.75	IPL Systems Inc.	25.75	2.25	9.57
OTC	1.50	0.13	Maxstor Systems	0.88	-0.13	-12.80
OTC	17.00	2.63	Maxtor Corp.	4.63	-0.50	-9.75
OTC	16.00	4.88	Micropolis Corp.	15.63	0.13	0.81
NYS	85.75	73.63	3M Corp.	87.88	0.13	0.14
OTC	14.50	8.00	Printronix Inc.	8.75	-0.50	-5.41
NYS	24.75	8.50	QMS Inc.	22.63	-1.88	-8.75
OTC	37.25	12.88	Quantum Corp.	34.00	-1.75	-4.90
NYS	7.50	4.38	Recognition Equipment	7.50	0.88	5.26
OTC	11.50	4.00	Reuel Inc.	11.50	0.63	5.75
OTC	18.88	9.63	Seagate Technology	13.25	-0.63	-4.50
OTC	41.00	11.00	Storage Technology	40.00	-1.38	-3.32
OTC	4.75	1.25	Tandon Corp.	3.94	-0.56	-12.89
NYS	26.38	11.63	Tektronix Inc.	24.75	-1.13	-4.88
OTC	0.63	0.10	Televideo Systems	0.21	-0.06	-16.53
NYS	80.13	69.00	Xerox Corp.	68.10	-1.90	-2.52
Leasing Companies						Up 0.72%
OTC	18.88	8.88	Amplicon Inc.	15.00	0.00	0.00
NYS	89.88	14.83	Comdisco Inc.	27.75	0.50	1.83
OTC	16.25	8.25	LDI Corporation	14.88	0.25	1.79
OTC	5.78	2.88	Selectarm Inc.	3.75	0.00	0.00

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U.S. warms to tech programs

White House report may signal willingness to support vital technologies

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — The White House strengthened signals last week that it is warming up to the idea of government-sponsored technology programs, particularly those likely to benefit the computer industry and its customers.

A technology panel appointed by the president's Office of Science and Technology Policy (OSTP) released a report detailing 22 technologies it said are critical to U.S. prosperity, national defense, energy, security and quality of life. Seven deal directly with information processing and communications (see chart at right).

Technology watchers hailed the 126-page report as evidence that the Bush administration may be prepared to support added help for U.S. industry, something it has generally opposed on ideological grounds.

"The report represents a substantial turnaround in thinking on the part of the administration," Rep. George E. Brown (D-Calif.), chairman of the House Science, Space and Technology Committee, said at a congressional hearing last week.

Micro Tech kickoff

Simultaneously, OSTP and the National Advisory Committee on Semiconductors (NACS), an industry/government advisory panel, kicked off Micro Tech 2000, a program intended to advance semiconductor technology. One goal is to help U.S. industry develop a 1G-bit static random-access memory chip by the year 2000.

More than 70 semiconductor experts from government, industry and universities last week drafted a "technological road map" to bring the U.S. to "the leading edge of semiconductor technology," said Ian Ross, chairman of NACS and president of AT&T Bell Laboratories. The road map will be made public at NACS' meeting next month.

At a press conference after the workshop, Ross said the Bush administration had made no commitment to Micro Tech 2000 beyond participation in the workshop. He said the charter of the workshop participants had been to outline a strategy for developing new "generic" technologies and not to say how or at what cost the strategy would be implemented.

The technologies list is similar to ones published earlier by the U.S. Departments of Commerce and Defense, but White House sponsorship of this latest catalog may take it further than the others.

"The value of research and development consortia needs to be assessed, and the role of federal laboratories should be examined," William D. Phillips, the OSTP official who heads the industry/government panel that prepared the report, testified at the congressional hearing.

"We also need to examine regulatory barriers, the limited available pool of capital and other inhibiting factors," Phillips said.

The White House says 22 technologies in six areas are critical:

Information and communications:
- Software.
- Computer simulation.
- Sensors and signal processing.
- Data storage and peripherals.
- High-definition imaging and displays.
- Microelectronics and optoelectronics.
- High-performance computing and networking.

Materials: 5 technologies

Manufacturing: 4 technologies

Biotechnology and life sciences: 2 technologies

Aeronautics and surface transportation: 2 technologies

Energy and environment: 2 technologies

Oracle

FROM PAGE 1

Intel 80386 — and to the fully 32-bit addressing scheme of Netware, compared with the 16-bit scheme used in the currently available version of the OS/2 operating system, on which LAN Manager operates. Netware also has lower system overhead than OS/2, analysts said.

Novell is reportedly pursuing an industrywide database strategy with other relational database management system companies, including Informix Software, Inc.

In September, Informix said it was developing another NLM for the Informix Online RDBMS, due in the third quarter.

To get performance equivalent to Oracle's unaudited 41-transactions-per-second benchmarks for the Oracle 6.0 NLM, Oracle configured an IBM-compatible Intel I486-based machine with 16M bytes of memory and 80M bytes of hard-disk capacity.

However, some beta-test site users reported configuring systems with 100M to 300M bytes of disk-drive memory to support the same functions in a production environment. The Oracle 6.0 RDBMS for Netware only needs an Intel 80386 machine with 9M bytes of main memory and 30M bytes of disk, Oracle managers said.

"You're now looking at very large networks being run from a single [LAN] machine," said Jim Reilly, senior director of marketing at Oracle's Desktop Product Division.

The Sybase SQL/Server and 18-month-old Oracle Server for OS/2 averaged about 11 trans./sec. under audited TP1 benchmarks, Reilly said. Reilly spoke at an Oracle Desktop products conference here, which drew more than 200 users, product developers and systems integrators.

Separate machines

Oracle suggested work groups of more than 50 concurrent users should seriously consider placing separate database and Novell file server Novell machines on large LANs.

"Both Novell and Oracle recommend that you separate specific tasks between database and file servers in a production environment," said Robert Bolt, a former Oracle developer who is now president of Database Server Systems, Inc. in South San Francisco. "But most companies are starting with a 10-user system, so they'll get into this technology on a single server."

Oracle said it has taken steps to prevent system crashes as additional users log on to the database.

Oracle said the product began shipping last Wednesday and is priced from $3,699 to $19,999, depending on the number of users.

Ounce of prevention

Information systems concerns could stall the implementation of industrial-strength RDBMS, such as Oracle Corp.'s Oracle 6.0 on user local-area networks. "Often, nobody takes ownership of all the pieces," said one frustrated New England database administrator who has worked with both the Sybase SQL/Server and Oracle Server for OS/2. "I want to point fingers at one person when something goes wrong."

Vendors are among those who are concerned about placing standard RDBMS products in the hands of unprepared end users. "In the proprietary world, a customer could go to one vendor and get one-point support," said Ron Ward, director of systems engineering at Compaq Computer Corp., which supports the Oracle/Novell, Inc. products on its machines. "Now people want to know how to take the pieces out of the box and to make it all come together."

Compaq, Novell and Oracle have all committed to work together to prevent such finger-pointing problems, users were told at the Oracle Desktop conference last week.

Novell Executive Vice President Darrell Miller said he expects IS groups in large corporations will, indeed, supervise data administration on work-group LANs. "In many cases, systems administrators will supervise the management of 20 to 30 Netware LANs throughout a company," Miller said.

Large companies such as Fluor Daniel, Inc., a Los Angeles construction firm, and Pfizer, Inc., a New York pharmaceuticals giant — both beta-test sites for the Oracle 6.0 NLM — may be best equipped to support work-group data administration, analysts said.

GUI support added to Cobol development tool

BY JEAN S. BOZMAN
CW STAFF

PALO ALTO, Calif. — Micro Focus Ltd. is expected to announce an enhanced version of its desktop Cobol development environment at a user conference in Orlando, Fla., May 13.

The enhanced software, Micro Focus Cobol/2 Workbench Version 2.5, has new support for graphical user interfaces (GUI). The new software is considered an upgrade of the 1-year-old Version 2.4 tool set, according to the $84 million company.

Major enhancements include support for Microsoft Corp.'s Windows 3.0 environment, mouse support, a Cobol editor and improved Help menus.

Version 2.5 is scheduled to be available in mid-May for $2,500 per unit. At the same time, the firm is also scheduled to ship Micro Focus Dialog System 2.0, a tool that will migrate Micro Focus programs written under MS-DOS to the OS/2 Presentation Manager interface without recoding.

One New Jersey beta-test user of the Version 2.5 tool set who did not wish to be identified said some longtime Cobol programmers accustomed to writing code with the IBM 3270 terminal interface may not elect to use the new GUIs.

"We have been using Micro Focus for the last two years because we have the flexibility to work on a PC in the office or at home," said this user, who likes the Windows 3.0 interface. "Otherwise, we would be using TSO on an IBM mainframe and not getting as much testing time as we would like."

AMD lets loose 25-MHz chip

SUNNYVALE, Calif. — Advanced Micro Devices, Inc. released details last week of its answer to Intel Corp.'s best-selling 80386SX microprocessor. The AMD versions, which will begin shipping in volume by the end of June, will run at 25 MHz, compared with Intel's 16- and 20-MHz chips.

AMD has its sights set on the power-constrained notebook personal computer market for its AM386SX-25 and SXL-25. Because of their static design, both chips draw 35% less power than their Intel counterparts when running at 20 MHz, AMD said. The SXL-25, which is also capable of standby-mode operation, reportedly will eke out an extra hour of battery life from a notebook PC compared with Intel's offering.

The chips are currently shipping in sample quantities.

Pricing is expected to be comparable to Intel chip prices, as was the case with AMD's recently unveiled AM386DX clone.

RICHARD PASTORE

NEWS SHORTS

Excel gets new functions

Microsoft Corp. updated its spreadsheet offering for the Apple Computer, Inc. Macintosh last week with the announcement of Excel for the Macintosh Version 3.0. It integrates more than 100 new features, including added data analysis capabilities, a button-oriented tool bar that speeds frequently used functions and full support for Apple's upcoming System 7.0 update, due May 13. The suggested price for the new Excel is $495, but registered users of previous versions can upgrade for $129.

Mitsubishi to sell IBM mainframes

IBM is forming a partnership in its core mainframe computer business with Mitsubishi Electric Corp. It is the latest sign of globalization in the computer industry, both firms said. The announcement was made by Mitsubishi last week in Japan and was confirmed by IBM in the U.S. IBM Japan Ltd., a wholly owned unit, will supply the key technologies of some of its mainframe computers to Mitsubishi. The Japanese company, which now commands less than 5% of the Japanese mainframe market, will sell machines in Japan under its own name.

Lotus plans Ultrix port

Almost one year from its initial foray into the Unix market, Lotus Development Corp. announced last week that it will port 1-2-3 to the current version of Digital Equipment Corp.'s Ultrix. The multiyear agreement covers current and future versions of 1-2-3. No other details of delivery or features were released. Development efforts began one month ago. File transfer will be supported between 1-2-3 for VAX/VMS and 1-2-3 for Ultrix to the extent that the environment allows it, said David Rome, Lotus' director of Unix products. Lotus has already ported 1-2-3 to Sun Microsystems, Inc.'s Unix and to AT&T's Unix System V.

LAN Manager OEMs team up

Twenty-four OEMs of Microsoft's LAN Manager have formed the Open LAN Manager Council to create greater interoperability among their own versions of the network operating system. Included in the council are AT&T, Ungermann-Bass, Inc., The Santa Cruz Operation and Nippon Telegraph and Telephone. The group plans to increase interoperability.

Intel chip to fly in new fighter

Lockheed's YF-22A, an advanced tactical fighter design recently selected by the U.S. Air Force, contains an implementation of Intel's 1960 microprocessor, the firm said last week. The I960 is the basis for the general-purpose data processor module within the Common Integrated Processor used in the aircraft. The architecture features built-in data security, fault tolerance and multiprocessing.

X.500 directory progress

The North American Directory Forum said last week that its late-March quarterly meeting produced draft documents for setting up a standard U.S. X.500 directory of electronic mail users. A forum spokeswoman said several members of the user community expressed security concerns regarding putting all of a corporation's E-mail users on one directory. One approach suggested, she said, was to include only company personnel who deal with the outside world.

Gandalf to take Infotron

Ottawa-based network equipment maker Gandalf Technologies, Inc. said last week it had signed a letter of intent with Infotron Systems Corp. to merge the company with a wholly owned subsidiary of Gandalf. Under terms of the proposed merger, 100 common or preferred shares of Infotron would be converted into 50 common shares of Gandalf. Infotron, based in Cherry Hill, N.J., makes wide-area network switches, multiplexers and network management systems. Gandalf also said it and Infotron had agreed in principle with Infotron's U.S. commercial bank lenders to restructure the company's loans.

NCR, AT&T merger close to complete

BY MICHAEL FITZGERALD
CW STAFF

AT&T and NCR Corp. appear locked in intense negotiations and could announce an agreement to merge at any time, analysts and others close to the situation said.

"It's a done deal," said Byron Walker, credit analyst at Moody's Investors Service. "But as they say in the business, it ain't over 'til after the deadline."

That means it could be settled any minute, or it could drag on behind closed doors for a few more days, observers said.

Still, AT&T last week conditionally met the $110-per-share, or $7.4 billion, price set by Charles E. Exley Jr., NCR's chairman and chief executive officer. On Wednesday, Exley will vacate the chair, as he lost his seat on the board of directors at NCR's annual meeting last month.

What appeared to remain on Friday was deciding how conditional AT&T's offer is.

AT&T offered a stock-for-stock deal that depends on AT&T's stock price at the time the merger is completed, perhaps as long as four months from when the agreement is announced.

Other AT&T conditions include Exley's cooperation in merging the operations and NCR's cooperation in helping AT&T convince the Securities and Exchange Commission (SEC) that it should treat the merger as a pooling of interests, which would allow the deal to be done tax-free. One Wall Street investment house, however, issued a report saying, "The SEC views pooling as 'forbidden fruit' and usually takes tough positions on it."

If the SEC does deny pooling, AT&T said it would offer to acquire 40% of NCR's stock at $110 cash per share and 60% for 2.943 AT&T shares each.

Exley's response to the offer was to send a letter to Allen stating that NCR was ready to "get on with the friendly merger you have wanted for five months" as long as AT&T would guarantee $110 per share for NCR shareholders. Exley set $110 per share as a ceiling that would double as a floor price unless AT&T's stock dipped below $32.50.

Maria Lewis, a telecommunications analyst at Cowen & Co. in Boston, said she hoped AT&T would not agree to the offer, because it could mean an extra $600 million. Others did not see this as a major obstacle.

"It's a noncash offer, so the major concern for AT&T is how much extra dilution to their earnings the additional 18.5 million shares would provide," said David J. Schofield, a computer analyst at Duff & Phelps Investment Research Co. in Chicago. "When you have 1.1 billion shares outstanding, we're talking another 1.7%."

AT&T's tender offer of $90 cash per share expires Tuesday. AT&T refused to comment on whether it would extend the offer.

Dbase

FROM PAGE 1

ruling: a copyright infringement suit against database rival Fox Software, Inc. that could still find Ashton-Tate's Dbase copyright to be invalid.

A trial date has not been set, but Ashton-Tate spokeswoman Linda Duttenhaver said the firm hopes to settle the case by negotiating "an appropriate business solution," possibly including a licensing agreement that would guarantee royalty payments from Fox.

David Fulton, chief executive officer at Perrysburg, Ohio-based Fox, waved away such ideas. "There is not a line of code in common between our product and theirs, so I don't know who would need to pay royalties," he said. "Obviously, we're not happy with [Hatter's] decision, but it just means that Ashton-Tate hasn't lost yet."

Ashton-Tate's original November 1988 suit alleged that Fox's Foxbase product unlawfully copied Dbase's concept, look and feel, programming language, sequence of events and arrangement of the program as presented to the end user. Opponents of the lawsuit argued that if a legal precedent is established for claiming proprietary rights to a programming language or a program's sequence of events, it could threaten the open base of all programming.

On Dec. 13, Hatter abruptly halted proceedings in the 2-year-old case when he declared that Ashton-Tate "knowingly" and "repeatedly" misled the U.S. Copyright Office by failing to acknowledge Dbase was a derivative of the Jet Propulsion Laboratories' Document Information System — a public domain application developed at the Jet Propulsion Laboratories in Pasadena, Calif. — when a copyright was applied for in the early 1980s. Hatter subsequently invalidated the Dbase copyrights.

Although Ashton-Tate's request for reconsideration was initially denied, Hatter did not enter a final judgment, and the company later filed a statement from the U.S. Register of Copyrights that said the company had followed the proper copyright procedure.

Dbase users have not been wholly supportive of the company throughout the case, claiming that in recent years, Ashton-Tate has failed to improve on its technology and used the courts rather than the research and development laboratories to protect its products. "We count on database packages to be similar because we've got a lot of time and training invested in using and integrating them," said Roland Murphy, an engineer at the Resources Conservation Co. in Bellevue, Wash.

Other users, however, said Ashton-Tate has the right to defend its turf. "Intellectual property is a very valuable asset," said Paul Von Fange, a senior engineer at 3M Co. in St. Paul, Minn. "I don't have any problem with Ashton-Tate protecting what is theirs."

The Ashton-Tate/Fox lawsuit is one of several industry legal dramas concerning copyright infringement, including Apple Computer, Inc.'s suit against Microsoft Corp. and Lotus Development Corp.'s action against Borland International, Inc. Goodman said Hatter's decision is unlikely to affect the other cases as it is very "fact-specific."

> "THE JUDGE MADE a very radical initial decision and consequently was subjected to an accelerated learning process."
>
> PAUL GOODMAN
> ELIAS, GOODMAN & SHANKS

$46 tape

FROM PAGE 1

records were on paper or microfiche, will be applied to electronic records. At the federal level, Sen. Patrick J. Leahy (D-Vt.), chairman of the Senate Subcommittee on Technology and the Law, is drafting legislation to modernize the federal FOI Act and make it easier to obtain computerized records.

Although there is now widespread agreement that even the most old-fashioned FOI laws cover electronic records, experts said that several related issues, including the following, are more controversial:

- Should agencies be required to release electronic records in the format sought by the requester?
- How much computer programming must an agency do to respond to FOI requests?
- To what extent should software and electronic mail be covered under FOI statutes?

On the format issue, Leahy's draft bill would require federal agencies to comply with "reasonable" requests for paper or electronic formats. "The requester should be entitled to whatever format the agency has available," said Henry H. Perritt Jr., a law professor at Villanova University in Philadelphia, "but the agency should not be obligated to create new records or formats."

For example, a requester should not be able to force an agency with ASCII data to release it in Wordperfect Corp.'s format, Perritt said.

Some agencies try to honor reasonable requests, while others assert that "even if it's available on tape or disk, they're going to give you a paper printout because the [FOI] Act permits them to do it," said John Podesta, an information policy consultant in Washington, D.C. "The only reason they're doing that is to give you a headache."

Maximum access

In the Brownstone Publishers case, the city government resisted providing the computer tape because it wanted to discourage commercial enterprises from making big profits off of the city's data-gathering efforts, according to a state appeals court decision. The court ruled last October that Brownstone was entitled to the computer tape because the "underlying policy of the law is to ensure maximum public access to government records," regardless of commercial interests.

Nevertheless, state and federal agencies generally argue that they should have unlimited discretion in how they release information to the public. When the U.S. Department of Justice surveyed federal agencies on the issue, for example, the Public Health Service responded: "We release in the form most convenient to the government. Requesters should not dictate the form of response. Not only would it be very expensive, but the government would become a free electronic service bureau."

FOI burden

Agency FOI offices, typically underfunded and overworked, are also alarmed about the administrative and data processing burdens of undertaking customized searches of their databases to fulfill FOI requests. Many take the position that creating or modifying a computer program — even writing a database query — to conduct an FOI search is an unreasonable burden.

"The agencies are willing to do customized searches, but it's very much on an ad hoc basis. They do it when they feel like it and don't want to be told that they have to do it," said Harry Hammitt, editor of the "Access Reports" newsletter in Lynchburg, Va.

Federal agencies are especially concerned that businesses could abuse the FOI process, turning the FOI offices into providers of custom business research and data services to the detriment of the agency's mission-critical information processing, the federal survey showed. "We would not want to become a national trade data researcher for economic consultants and student researchers," the International Trade Commission said.

One reason for the agency resistance is that fees paid by FOI requesters are sent to the U.S. Department of the Treasury, not recouped by the agency. Leahy's draft legislation tries to address the problem by pouring one-half of an agency's FOI fees back into FOI operations.

Need flexibility

Agencies also complain that their homegrown databases are not flexible enough to retrieve and sort data the way that FOI requesters would like. On the other hand, those agencies that have installed relational database management systems reported that they could easily extract the necessary data and separate it from any information that is exempt from disclosure.

In fact, agencies such as the Federal Trade Commission and the Health Care Financing Administration said that writing small computer programs to eliminate exempt material is much less labor-intensive and less costly than making photocopies of printouts and using markers to black out the passages.

"Technology is certainly fixing the problem but not everywhere or fast enough," said Thomas M. Susman, a Washington, D.C., attorney who studied FOI issues for the American Bar Association. He said legislation is needed to make electronic FOI practices more uniform throughout the government.

While the cumbersome FOI Act may be needed for some hard-to-get data, most commercial information publishers obtain routine government statistics by purchasing computer tapes at "marginal costs," said Kenneth B. Allen, senior vice president of the Information Industry Association (IIA) in Washington, D.C.

However, according to Allen, the IIA is concerned that many states are planning to charge commercial market rates for their public information. The states view the sale of public data as a handy way to raise revenue and alleviate budget deficits, but Allen argued that the trend will discourage a competitive marketplace and drive up the cost of public information.

In the long run, it would be best for FOI requesters and agency FOI officers if government information systems were designed from the outset to allow for ad hoc queries and public access, according to several experts. Ideally, that would be just good IS management practice, but Podesta said that agencies need the prodding of a legislative mandate to consider the issues of public access at the start of systems design.

Open records?

A survey of 70 federal agencies found general opposition to any mandate to conduct customized database searches under the Freedom of Information Act, although it may be done voluntarily

Should agencies be required to create or modify computer programs to search databases for users?
YES 3
NO 53
NO POSITION 14
Should agencies be required to provide records in the format sought by the user?
YES 2
NO 41
NO POSITION 27

Source: U.S. Department of Justice report (October 1990) CW Chart: Doreen St. John

President Bush boots up his first computer

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — President Bush, vowing to become computer literate, found the on/off switch and fired up his first computer last week.

The 66-year-old chief executive had a personal computer installed in his study near the Oval Office, spokesman Marlin Fitzwater said. Consistent with his Education 2000 initiative for continuing adult education, Bush said he hopes to dramatize that "we're never too old to learn" by taking computer lessons, according to Fitzwater.

Taking the plunge

The president was persuaded to take the plunge by Education Secretary Lamar Alexander and first lady Barbara Bush, who travels with a laptop computer to write her diary.

According to Fitzwater, the president will be getting half-hour computer lessons once or twice per week from Dorothy Crumling, a computer specialist in the White House Office of Administration.

Fitzwater and IBM refused to say what computer model the president has, but one source said the White House standard is IBM Personal System/2s running Wordperfect 5.0 software from Wordperfect Corp.

So far, Bush has mastered how to switch the computer on and has written some memos.

The president, describing his first computer experience to a group of mathematicians, said he was a little worried about pressing the buttons "but it was fun, and I will keep it up."

When reporters asked whether the president's system has a mouse, Fitzwater admitted his own computer illiteracy by asking, "What's a mouse?"

Software: Classified?

Perhaps the most controversial public-access issue of all is whether government agencies' computer software is an "agency record" that should be released under freedom of information (FOI) laws.

Many federal agencies argue that software is merely a tool and not a record, but there is little practical experience or legal guidance on how to classify software. If software is released to the public, there is also the question of how to protect the copyrights of commercial software products.

Some FOI experts argued that software should be covered by FOI laws because requesters need the software that goes with the database, but there should be exemptions to protect commercial interests. Software written by federal agencies is not copyrightable.

Villanova University law professor Henry H. Perritt Jr. said it would be a mistake to "wall off software from FOI Act disclosure because once you start dealing with electronic information there is a bona fide need to have the retrieval software if you're going to be able to use the data."

MITCH BETTS

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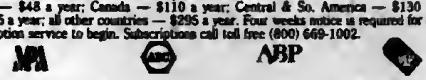

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TRIVIA TIDBITS

1. Dick Heiser opened the world's first microcomputer store in West Los Angeles in 1975. Was it called Computerland, The Itty Bitty Computer Co. or The Computer Store?
2. Only 220 examples of this computer were produced at $666.66 apiece, but they helped launch a major microcomputer company. What was the computer?
3. Who wrote the first book about personal computers in 1974? Can you name the book?
4. How long would it take to send the Encyclopaedia Britannica over a 2G-bit fiber-optic cable? Two seconds, two minutes or 20 minutes?
5. What high-tech company determined whether the 18-minute gap in the Nixon/Watergate tape was deliberate?

These questions come courtesy of the Computer Bowl contest, sponsored by the Boston Computer Museum. This year's third annual trivia event was held on the West Coast April 26, with two women as the team captains for the first time. Heidi Roizen, computer historian and president and CEO of T/Maker Co. led the West team, with computer book author Pamela McCorduck at the helm of the East team.

1 The Computer Store 2 The Apple I 3 Ted Nelson, Computer Lib and Dream Machines 4 Two seconds 5 Bolt, Beranek and Newman Inc

DO YOU KNOW...

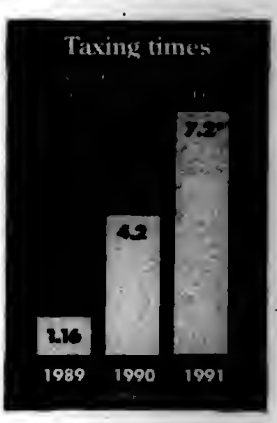
- What a Cadillac Fleetwood would cost today if its price had dropped at the same rate as that of computers during the last 37 years: Under $3
- How many attendees the now-defunct National Computer Conference drew in its heyday in 1983: 97,000
- Sabre's peak hour usage per second: 2,682 messages. Per day: 106.8 million messages
- How long it took Compaq Computer Corp. to break into the Fortune 500: 4 years (a record)
- What Lotus founder Mitch Kapor used to teach: Transcendental Meditation
- How far electricity can travel in a nanosecond: 10.8 inches

It's *spring*. That means baseball. And taxes.

Street & Smith's Baseball magazine has picked the teams it expects to lead the American and National Leagues. But how do their top four score in technology terms?

AMERICAN LEAGUE

East: Toronto Blue Jays. The Blue Jays' information systems department is hitting home runs in the scouting game. According to IS manager Hans Frauenlob, all scouts carry laptops — a combination of Compaq LTE/386s, LTE/286s and older Grid Systems Corp. machines. The team also relies on the Baseball Information System, an IBM-Major League Baseball database that contains stats, waiver, player contract, scouting and league schedule information.



West: Oakland Athletics. They may have heavy hitter Jose Canseco, but the A's strike out when it comes to IS. Pretty much a manual operation, the team gets its statistics from the Baseball Information System.

NATIONAL LEAGUE

East: Chicago Cubs. PCs score big with the Cubbies. IS specialist Carl Rice has put in place a 64-node Novell, Inc. LAN with IBM PS/2 55SXs as the PC standard. The club also has seven PS/2 Model 70s, eight Model 30s and a couple of PC XTs. Stats, salary and scouting info on the minor leagues and amateur players are kept on a Paradox DBMS.

PLAY BALL!

West: San Francisco Giants. National League champions in 1989, the Giants hope to claim back the title in 1991, but it won't be because of any breakthroughs. The Giants use Baseball Information System stats, with promotional staff occasionally taking postgame notes on Compaq laptops.

Sources: The Internal Revenue Service, Europe 1992 and the New World Power Game, John Wiley and Sons, American Airlines; Special thanks to the Boston Computer Museum

INSIDE LINES

Balloons filled with hot air?

▶ Steve Jobs got out the balloons and noisemakers a few weeks back to declare that Next has sold 8,000 of the distinctive ebony workstations in the first quarter. But on second look the numbers looked less impressive. One interviewer was told that the number included at least 1,500 upgrade boards and many back orders. International Data Corp. researchers are even more critical, claiming that the Redwood City, Calif.-based firm has sold only 4,000 machines in its history. A Next spokeswoman confirmed that about one-quarter of the 8,000 figure is back-ordered machines and that board upgrades were also included, but she couldn't say how many.

Adding to the Fleet

▶ So far, Fleet/Norstar Bank is keeping mum on its IS plans for the failed Bank of New England, which it will acquire from the Federal Deposit Insurance Corporation. Fleet Chief Information Officer Michael Zucchini continues to lead a due diligence effort on consolidation possibilities and said he will announce details later. Fleet is no stranger to this: In the past three years under Zucchini's direction, the Providence, R.I.-based bank has consolidated 12 data centers into one and 16 operations centers into four.

Could have used him in the negotiations

▶ Among the speakers at AT&T Computer Systems Division's user conference appropriately titled "Managing Change," was former U.S. Secretary of State Henry Kissinger, who told attendees that Americans like solutions and don't like processes, as is evident in our Middle Eastern policy through the years. One attendee said she thought this related to computers in the sense that "we think if we could just install the damn system, everything will be fine, but of course it won't."

Downside to street PC prices

▶ It's still too early to tell how much of Compaq's recent price reductions will filter down to street prices, but at least one large Compaq customer says the cuts look better on paper than in real life. He is getting about 15% to 20% lower street prices on certain PCs that Compaq cut by 34%. Dealers may be holding back as much as one-third of the advertised list price reductions to make up for purchase agreement changes.

New mainframe opportunities!

▶ Novell may be a little more reliant on its new partnership with IBM than it originally thought. In preparation for the May debut of Netware for SAA, Novell is holding classes on the product for its resellers who are tight with both mainframe and PC systems. Although there are thousands of current Novell resellers, only 10 qualified students showed up for the first class last week, according to one attendee.

Much to talk about

▶ In other Novell news, the firm's executive vice president of marketing and services, Darrell Miller, will be pressing the flesh with key clients this week about Novell's new product support strategy. Miller is calling the tour a "prelaunch." Network managers and resellers had little to say about the strategy except that it's about time for any new emphasis on support.

Images come back to haunt

▶ The California drought has been wearing on Silicon Valley, but it landed Cypress Semiconductor President T. J. Rogers in hot water. Rogers has appeared in ads proudly boasting of his company's water conservation efforts. But the firm was recently cited for dumping industrial water into a local sewage system.

Who woulda thunk it! Wall Street's computer golden boy, Compaq, shocks investors with news that it may in fact not be immune to the ups and downs of the industry, and Data General looks like a candidate for turnaround star of the year after posting two consecutive profitable quarters. Are we witnessing history in the making? Let us know who's hot and who's not, and we'll follow up. Contact News Editor Pete Bartolik at (800) 343-6474, fax those tip sheets to (508) 875-8931 or hook up to Compuserve at 76537,2413.

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